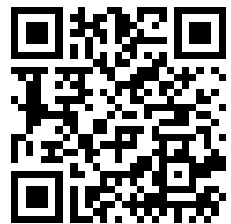


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**Journal**  
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## Journal

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## Royal Army Medical Corps.

*Original Communications.*

## EFFECTS OF HEAT IN IRAQ.

BY MAJOR H. M. D. SHEPHERD, M.D., M.R.C.P.E.,

*Royal Army Medical Corps.**Medical Specialist to a General Hospital.*

[Received November 22, 1944.]

UNDER wartime conditions it frequently happens that medical officers serving abroad are unwilling to write papers about their medical experiences because they have been unable to study the literature concerning their subject. The writer hopes that the publication of this paper may be considered justifiable in view of the large number of cases of heat effects seen, under varying conditions, and in spite of his admitted ignorance regarding what has already been written and his lack of proper records.

## MATERIAL.

The cases on which this paper is based were seen in two Indian Combined General Hospitals situated in the plains of Iraq during the summers of 1941, 1942 and 1943. The exact number of cases seen is not known as no proper record has been retained for the years 1941 and 1943. For the period June to September, 1942, however, records have been kept and during this time cases labelled heat effects numbered 594—533 British and 61 Indian. Many of these were characterized only by a short attack of pyrexia and whether they were correctly diagnosed as effects of heat is a matter which is open to question and will be discussed later. During the other two years rather fewer cases were seen, but the proportion of Indian to British was about the same. The proportion of severe cases among the Indians was higher than among the British.

Conditions varied during the three years concerned, the most important changes being as follows :—

(1) During 1941 and 1942 the writer was working in a hospital situated at a port, and in consequence many of the cases seen were admitted from, or had recently been on board, ships. In 1943 the cases were seen in a hospital situated in a desert station.

(2) The first hospital consisted mainly of a very solidly-built stone building with thick walls and big verandas and the wards in this building, though reasonably cool by day, were very hot at night. The beds of the second hospital were partly in temporary buildings with thin walls, without verandas, and partly in tents. The tented wards were Y-shaped, each arm of the Y consisting of 6 or 7 E.P. I.P. tents and being sunk four feet into the ground.

It was found that the thick-walled wards were unsatisfactory because, though cool by day, they were very hot indeed by night. The tented wards were reasonably satisfactory being cool at night though very hot during part of the day. The thin-walled wards were fitted with air-cooling devices of only moderate efficiency and were the best. The ideal, of course, is a satisfactorily air-conditioned ward which will remain cool during the whole twenty-four hours but if this cannot be obtained it seems better that the patients should be comfortable at night so that they can sleep even if this involves their being very hot during part of the day. It was the absence of any real "let up" during the twenty-four hours that made the thick-walled wards so unsatisfactory.

(3) One of the most interesting changes which took place was the increase in our knowledge and understanding of these cases during the period. This increase was slower than it might have been because the summer of 1941 was an unusually cool one. The writer on looking back cannot but believe that some of the deaths in the early part of the period would not have taken place if he had had a greater understanding of the many ways in which effects of heat can be manifested.

#### ÆTIOLOGY.

It would appear that an individual suffers from effects of heat either because his heat regulating mechanism becomes exhausted and fails, allowing his temperature to rise, or because he loses a great deal of water and salt by sweating, fails to make good the loss by increased intake and becomes dehydrated and short of chlorides. Whether there are other chemical changes of importance is a question into which the writer does not propose to enter. Shortage of chlorides is the important one from the diagnostic point of view because a rough test for the urinary chlorides can so easily be made.

These are the mechanisms through which effects of heat are produced, but there are many contributory causes.

(1) *Climate*.—Obviously the higher the temperature and the damper the atmosphere (which allows less cooling by evaporation) the more likely cases are to occur. It is perhaps not always realized how much difference slight changes in humidity and wind conditions make. In the summer of 1942 it was often necessary for the writer and his commanding officer to discuss whether the hospital had enough empty beds; if there was a south wind (which led to increased humidity), or very little wind, many more admissions had to be allowed for.

(2) *Length of Time in a Tropical Climate*.—No helpful figures regarding this point could be obtained but it was thought that men newly arrived in the tropics were more liable.

(3) *Physical Exertion*.—Many examples of patients becoming affected during or after a march were met with. Men who had to do a march, even a short one, soon after disembarking when they may have been lacking adequate food, drink and sleep, were particularly vulnerable. On one occasion a batch of five severe cases, one of which proved fatal, was admitted following a march of  $1\frac{1}{2}$  miles performed by a small Indian unit soon after leaving their ship.

(4) *Fluid and Salt Intake*.—No figures regarding this can be produced but there can be no doubt that a large intake of salt and water helps to prevent the occurrence of cases.

(5) *Other Disease*.—The majority of the cases seen had no other disease present. Quite a number, however, had been recently in hospital for other conditions and any condition producing a temperature can be a predisposing cause. Effects of heat were seen following or during attacks of pneumonia, malaria, diarrhoea, sandfly fever, urinary infection and other diseases. It is of the utmost importance to remember that effects of heat may arise during the course of any illness. Constipation appears to be an important predisposing cause.

(6) *Exposure to the Sun's Rays*.—This in itself does not appear to have any ætiological importance and no evidence was found which supported the existence of so-called sunstroke, i.e. a condition produced by the sun's rays as opposed to its heat.

(7) *Previous Attacks*.—In 1942, 2 per cent of the cases had been admitted to hospital before for the same condition. In view of troop movements and the situation of the hospital

this figure is probably abnormally low. Most of the men admitted more than once suffered from inability to sweat properly.

(8) *Psychological*.—No evidence was found which suggested that anxious individuals were particularly liable to suffer from effects of heat. The impression was obtained that they did not as a rule become severely ill, presumably because they reported sick or collapsed sooner than their fellows.

(9) *Ship Travel*.—Many cases were admitted directly from ships' hospitals, and many of them were very gravely ill. It appeared that "heat" patients treated in ordinary ships' hospitals did very badly.

#### TYPES OF CASE AND CLINICAL FEATURES.

When the writer went to Iraq in April, 1941, his ideas about heat effects were roughly as follows. There were two conditions produced by a high atmospheric temperature; the first was a very dangerous condition known as heat stroke characterized by hyperpyrexia and coma; the second was a troublesome though usually harmless condition called heat exhaustion characterized by dehydration and lack of salt. Experience showed that these ideas were exceedingly inadequate and that the true state of affairs was more complicated.

As has been noted already there are two mechanisms which produce effects of heat—loss of temperature control and shortage of water and salt. In any one case either or both of these factors may be at work, and the actual type of case produced seems to depend on how great an effect each factor is having. Thus every stage of case may be seen from the classical heat stroke with hyperpyrexia and coma to the classical heat exhaustion with a subnormal temperature, dehydration and salt lack.

Four varieties of cases will be described.

(1) *Acute Heat Stroke*.—The patient is admitted in a semi-conscious or unconscious condition and the rectal temperature is found to be 106 or over. There may be muscular twitchings, cyanosis or convulsions.

He may be extremely restless and almost always is while he is being cooled down.

When he starts to recover he often vomits. It is usually found that the temperature comes down fairly easily with treatment but that he remains unconscious after it has been brought down to a reasonable level. How long he remains unconscious depends mainly on how long he was ill before treatment was started, but most recover consciousness in a few hours. During convalescence these patients are often exceedingly pale although not anæmic. Mental abnormality, inability to sweat, and a slightly raised temperature may persist for weeks.

They may have been perfectly well until a few hours before their illness or they may have been off colour for a day or two and have noticed inability to sweat or frequency of micturition.

One patient of the writer's was semi-conscious and unable to swallow for a week. Two months later he left Iraq *en route* for the United Kingdom and was then well except that his speech was slightly abnormal and his cerebration was slow.

(2) *Heat Exhaustion*.—At the other end of the scale comes the case whose condition is due entirely to dehydration and salt lack. Here the patient is extremely lethargic and often drowsy. His tongue is dry and his urinary output low (or in a severe case absent), but in spite of this he will not be bothered to drink unless he is made to. His blood-pressure is low, perhaps 104/60 in a mild case or 95/40 in a severe one. In some cases it is found that the systolic pressure is reduced and the diastolic normal. He may have convulsions, and heat cramps may occur. The urinary chlorides in this type of case are reduced or absent. It is convenient to note here that in 1942 it was found that the urinary chlorides of all heat effects cases were normal in 22.5 per cent, diminished in 43.3 per cent and absent in 34.3 per cent. The silver nitrate test was used.

(3) *The Subacute Case*.—Many examples of this type of case were seen and they caused a great deal of trouble. The temperature is commonly about 103 to 104 but may be lower. In the milder cases the temperature and symptoms due to it are the only clinical features but



the fever may continue for as long as two weeks. In the more severe cases there may be vomiting, muscular twitchings, convulsions or abnormal behaviour varying from the very slightest disorientation to the most violent mania. In many of the severe subacute cases the temperature is normal for some days after the onset and then rises gradually to 104 or 105.

Many cases are remembered individually in whom the first sign was a change in behaviour. Some of these were already in hospital with some other condition, and the medical officer's attention would be drawn to them by the Sister saying that so and so "is strange in his manner." Examination then showed that so and so had a vacant expression, was somewhat disorientated and failed to answer any but the most simple questions. As a rule his further progress depended on how he was treated. If he was given immediate vigorous treatment for heat effects he recovered; otherwise he did not. In 1941 and 1942, 4 or 5 patients were sent for admission in the first place as mental patients.<sup>1</sup> Some of these were Indians whose behaviour was maniacal. The temperature of these patients might or might not be raised, but they were all suffering from subacute effects of heat.

In several instances the first obvious indication of trouble was the occurrence of a fit. In the first patient of this kind seen, the diagnosis was missed and the disease proceeded untreated to its logical conclusion—death. The lesson was learnt and subsequent cases were treated with more respect. In a few cases the symptom for which they were admitted was vomiting and, whether or not the trouble was originally due to heat, they quickly developed effects of heat.

(4) *The Short Fever Type of Case.*—Medical officers who have worked overseas are familiar with the patient who has a temperature for a few days and then recovers without giving any indication of the cause. It is the writer's contention that many of the cases of this type which he saw in Iraq were in fact mild effects of heat. The evidence in favour of this view is that they showed none of the features of sandfly fever (though patients with sandfly fever were seen), or of any other disease, and that the number admitted at any one time depended on the weather. There was no doubt at all that far more of these patients were admitted on the bad days than on the less hot days, and during the winter the number of them was small. On one occasion a unit medical officer told the writer that "the sandflies had been usually busy in his unit during the previous two days." It was true that the unit had had an abnormally large number of short fever cases but none of them looked like sandfly fever, and weather conditions during those two days had been particularly bad owing to an almost complete absence of wind. An additional argument is that as these short fever cases are rare in winter and common in summer the cause must be some factor which is present in summer and not in winter. Sandflies?—but most people would agree that the majority of these cases are not sandfly fever; mosquitoes?—they are not malaria or dengue; flies?—but flies in Iraq are much less numerous in the hottest part of the summer, when these cases are most numerous, than they are in the early and late summer. We are left with two possibilities: either the cases are due to some unknown disease carried by an insect or they are due to climatic changes, i.e. heat.

It would have been interesting to have seen the effect of placing a proportion of these patients straight into really cool rooms, but owing to the shortage of really cool rooms it was never possible to carry out a properly controlled test on these lines.

It should be emphasized that the writer is not suggesting that all short fever cases with no signs of any particular disease should be labelled effects of heat. He is merely contending that the majority of the short fever cases which he saw in Iraq in summer time were due to heat.

It is convenient at this point to consider what should be regarded as a normal individual's temperature in a very hot climate. The writer's conclusion is that the normal temperature of a patient in hospital is the same as it is in a temperate climate, i.e. well below 98·4°. As

<sup>1</sup> This was frequently noticed in India. It was pointed out by Major J. Bennett, in 1924, that such cases were occasionally sent for a psychiatric opinion. The editor has seen a few such.—Ed.

regards apparently healthy men doing their ordinary work it was found that Indians doing physical work had temperature of 98·4 or below, but that in Europeans doing sedentary work the temperature was quite often above 98·4 and might be as high as 99·6.

*Nomenclature.*—It is suggested that the term "acute heat stroke" be used only for those cases with hyperpyrexia; that the term "subacute effects of heat" be used as was suggested in Iraq for those cases showing a continued moderate fever or a short fever associated with other features due to heat; that the term "heat pyrexia" be coined and used to describe the short fever case without other features; and that the term "heat exhaustion" be used to indicate the case without fever where the main feature is dehydration and salt lack. Cases, however, often show a mixed character.

#### DIAGNOSIS.

Certain general points regarding the investigation of the cases seen must be made.

(1) All the febrile patients had blood slides examined for malaria parasites and usually this was repeated several times. All the severely ill afebrile patients also had blood slides examined. All the patients whose temperature lasted for more than four days had total and differential white counts, urine examinations, stool examinations and blood cultures. In the long continued fever, urine and stool cultures and agglutination tests were also carried out. Sometimes chests were X-rayed and lumbar punctures performed. In some cases quinine was given as a diagnostic measure, in spite of negative blood slides. There is no doubt that the investigation of the febrile patient was, as is usual in military hospitals overseas, very thorough.

(2) The diagnosis of the heat stroke cases was easy. None of the cases had palpable spleens and the blood slides were all negative. There seems no particular reason why a patient with any febrile disease, e.g. pneumonia, should not get heat stroke but in fact all the patients seen with hyperpyrexia proved to have no other disease besides heat stroke.

(3) Subacute Effects of Heat: This depended on the lack of indication of other disease shown by physical examination and investigations and the response to proper treatment. The cases of this type who died showed no sign of other disease at post-mortem. The exhausted dehydrated appearance combined with drowsiness or mental change of many of these patients was very characteristic. It is particularly important to realize that often the severe subacute cases have a normal temperature at the beginning of their illness and for some days afterwards.

(4) The diagnosis of the short fever case has already been discussed.

(5) Heat Exhaustion: The low blood-pressure, the low urinary output, the usually absent chlorides and the exhausted appearance present a characteristic picture.

In general, regarding the diagnosis of all types of case, it may be said that it is usually fairly easy to decide that a man is suffering from the effects of heat. Whether he is also suffering from some other disease may be doubtful for a time. Further observation and the effect of treatment will decide the matter.

#### PROGNOSIS.

During the three years there were about 24 deaths: 12 of them occurred in 1942 and of these a record has been retained. It is considered that some conclusions can be drawn from a consideration of these 12 cases.

(1) Six had hyperpyrexia at some stage in their illness.

(a) A British soldier, aged 44, was admitted one afternoon with a temperature of 103. He seemed no worse than many other patients of the same type but during the night he was suddenly found to be in coma with a temperature of 110 (rectal). His temperature was quickly brought down to 102, when cooling measures stopped, but it continued to fall until it reached 97. He died the next afternoon. He was an obese, flabby individual.

(b) A young Indian, exact age unknown, was admitted to an M.I. Room outside the hospital about 17.00 hours in a comatose condition with a temperature of 111. He had been alone in his tent since midday and was not well then, so that it is not known how long

he was unconscious before being discovered. He was treated for  $1\frac{1}{2}$  hours in the M.I. Room and then sent to hospital, the temperature having been brought down to 103. He died soon afterwards.

(c) A British soldier, aged 46, had had heat-stroke with hyperpyrexia in another hospital and was transferred a week or two later by which time temperature was nearly normal and he seemed reasonably fit. He spent two days in a hospital barge and arrived moribund.

(d) An obese ship's officer aged 45, who was said to drink too much, developed a temperature of 108 on board ship eight hours before he could be landed. His temperature was lowered on board but he died an hour or two after admission.

(e) An Indian, aged 29, developed hyperpyrexia after a short march and had to be treated for some hours in a place without proper facilities before he could be transferred to hospital. He died two hours after admission.

(f) A young British soldier, age unknown, developed hyperpyrexia on board ship and had to be treated in the ship's hospital for two days before being admitted to the shore hospital. He died twelve hours after admission.

The rest of these 12 cases were examples of "Subacute effects of heat" and with almost all of them there was delay, either before or after admission, in realizing the true nature and seriousness of the condition and there was consequently delay in starting proper treatment.

Examples are as follows :—

(a) A young British warrant officer was admitted to hospital with M.T. Malaria ; he was diagnosed at once and treatment begun with quinine. His temperature came down quickly but when it had been normal for two or three days it was suddenly noticed one afternoon that his expression was vacant and he could not talk properly. He gradually got worse, the temperature rose to moderate heights, and the next day he had a fit and died. Recurrence of malaria was thought to be excluded by negative blood slides and the lack of effect from two intravenous injections of quinine. He had had two days' treatment with atebirin when the symptoms started but the early onset and the fatal result appeared to rule out atebirin intoxication.

(b) An almost identical case was seen in a young British soldier who had had an operation for piles two weeks previously.

(c) A British soldier, aged 25, was admitted because of vomiting. He had been travelling in a road convoy and had not been well for several days. He was moderately dehydrated, had a lowered blood-pressure and appeared hysterical. After two days in hospital a drip was started but he died soon afterwards. It was felt afterwards that the seriousness of his condition was not realized quickly enough.

From a consideration of these cases taken in conjunction with the many other more successful cases the writer considers that it is true to say that it should be the exception for a healthy young man who develops even the most severe forms of effects of heat to die provided he can be brought quickly to a place where he can be properly treated.

Certain other points in connexion with prognosis can be stated.

(1) Mental changes, whatever the temperature, constitute a most dangerous sign and demand vigorous treatment.

(2) Vomiting is a dangerous sign except in patients who are beginning to recover from heat stroke, and then, provided it only lasts a short time, it is a sign of improvement. .

(3) Obesity and an age of more than 40 worsen the prognosis.

(4) A patient with heat stroke should never be regarded as past hope until he is dead. There is no other condition in which a patient can look so ill and yet recover.

(5) It may be more dangerous for a man to have severe subacute effects of heat than it is for him to have heat stroke. The reason for this is that heat stroke is an obvious emergency and receives vigorous immediate treatment whereas subacute effects of heat may not. Also the subacute case in the later stages is more resistant to treatment than acute heat stroke.

(6) A man who has had severe effects of heat must be very carefully treated for many weeks afterwards.

It is not possible to give useful figures regarding the length of stay in hospital of the cases in 1942 because most of the more serious ones were either transferred to other hospitals to

complete their convalescence or were evacuated out of the country. The average stay in hospital of the short fever type of case was 7·7 days. In 1943 the average stay was about one day longer.

#### TREATMENT.

A discussion on treatment can be conveniently divided into three sections: first antipyretic; secondly treatment directed towards the replacement of salt and water; and thirdly additional treatment.

(a) *Antipyretic Treatment.*—In a case of heat stroke, the first essential is to have a well planned “drill” with which everyone concerned is familiar so that treatment can be started without a moment’s delay and not interrupted. If the heat-stroke centre is even two hundred yards from the reception room treatment should be started in the reception room and carried on in the ambulance which conveys the patient to the heat stroke centre. The cooling treatment adopted by the writer was to lay the patient naked on a bedstead or Indian charpoy covered with a blanket (not a mackintosh which collects water) under a ceiling fan. Table fans beside him created further draught and the whole skin surface was kept wet with ice-cold water. No additional cooling treatment, e.g. ice-cold enemata or swabbing the skin with ice, was employed because it seemed probable that the most effective cooling mechanism is the evaporation of cold water from the skin. The giving of an enema also has the very real disadvantage that after it has been given there is no accurate method of taking the temperature in an unconscious patient whose skin is wet. The rectal temperature was taken at intervals perhaps every five or ten minutes at first, every fifteen or twenty minutes later. Drastic cooling measures were stopped when the temperature had been lowered to a reasonable level. The exact level depended on the original temperature. Thus if the original temperature had been 110, treatment was stopped when it reached 104; if the original temperature had been 106 it was lowered to about 102. The danger of lowering the temperature too quickly appears to be a real one, and the writer saw one patient (whose case is described above) where death may have been due to this cause. After drastic cooling measures have been stopped the practice was to dry the patient, place a dry blanket underneath him and leave him on his bed either uncovered or with only a sheet over him. It is sometimes recommended that the patient should be wrapped in blankets in order to start him sweating. This was tried once or twice but the results were felt to be unsatisfactory, as the temperature usually rose again. This treatment was carried out in a heat-stroke centre—a room or building with artificial air cooling. In the centres used by the writer the temperature varied between 70° and 90°, depending on climatic conditions and the number of persons in the room. After perhaps ten hours in a case of moderate severity the patient may be expected to appear fairly normal except that he still has a moderate pyrexia, e.g. 103. It may be some weeks before the temperature is really normal, and during the whole of this time the man should if possible be kept in an air-cooled room.

Patients suffering from subacute effects of heat should be placed in a heat-stroke centre and cooled by sponging but the antipyretic treatment need not be so drastic. The effect on these patients is sometimes dramatic, the temperature which has perhaps been present for several days dropping at once, but if a patient goes back to his general ward too soon it goes up again. This was seen repeatedly, when patients had to be sent back to the ward too soon to make room in the heat-stroke centre.

The short fever cases could not as a rule be accommodated in the heat-stroke centre and their anti-pyretic treatment consisted of sponging twice a day. The heat-exhaustion patients with little or no fever improved markedly when placed in a cool ward.

(b) *Fluid and Salt Replacement.*—Extra salt was given to all patients who could swallow it without vomiting. After a certain amount of trial the method used was to give four grams three or four times a day in a glass of water. It was thought that this method was better than adding salt to all drinks because with the latter method some patients were discouraged from drinking, whereas when salt was given three or four times a day as a medicine,

and the urinary chlorides gradually became normal, the patients felt something had been achieved and their morale improved.

As much cold water and fruit juice as possible was given to patients who could swallow, and in any severe case intake and output charts were kept. No case, however mild, was discharged until his urinary chlorides were normal.

Short fever cases almost never required intravenous fluid, and only those heat-stroke cases who remained unable to swallow for more than a few hours were given intravenous drips. The majority of the subacute cases and the heat-exhaustion cases received intravenous saline drips. The decision to give a drip in any case depended on its severity, the blood-pressure, the urinary chlorides, the oral intake and the urinary output. A case treated in an ordinary ward was more likely to need a drip than one treated in the heat-stroke centre. The amount of fluid given by intravenous drip varied from 3 pints to about 20. It is said that it is easy to drown a patient by giving too much fluid. Only one case was seen in which it was clear that too much fluid was given; this man developed renal failure and it was not realized in time that his oliguria was due to this and not to continued dehydration. This patient died.

The fluid given was almost always 0.9 per cent saline with or without 5 per cent glucose. When much fluid has to be given it is probably wise, as has been recommended, to change the solution to one containing less salt.

(c) *Additional Treatment.*—(1) Oxygen: This was given to some 10 severe heat-stroke cases, with apparent improvement in two. In one of these in which there was cyanosis and convulsions the improvement was dramatic, the cyanosis disappearing at once and the convulsions soon afterwards.

(2) Quinine: 6 gr. of quinine were given intravenously to all heat-stroke cases. Although none of these ever showed any sign of malaria this practice is probably a good one.

(3) Lumbar Puncture: A number of diagnostic lumbar punctures were carried out. Neither in these nor in three cases in which it was performed as a method of treatment was any benefit apparent.

(4) Venesection: The writer has no experience of this in the treatment of heat effects.

(5) Exercise: It was considered important that all cases should be made to take a certain amount of exercise before being discharged. (Owing to local conditions almost all the mild cases were discharged to duty and not sent to convalescent depots.) Whenever possible the patients were given "set" walks to do, e.g. "twice round the main block." It was thought that the mild discipline involved and the fact that improvement was made more obvious had a good effect on morale.

#### SUMMARY AND CONCLUSIONS.

(1) A description is given of the investigation and treatment of effects of heat cases seen in two military hospitals during three summers in the plains of Iraq.

(2) The immediate and predisposing causes are discussed.

(3) The clinical features are described and the suggestion is made that effects of heat cases can be divided into four types, which might be named: acute heat stroke; subacute effects of heat; heat pyrexia; and heat exhaustion.

(4) It is suggested that many of the short fever cases seen in Iraq were due to heat.

(5) The importance of the subacute effects of heat case is stressed.

(6) Treatment is discussed under three headings: antipyretic; fluid and salt replacement; additional treatment.

In conclusion it may be said about effects of heat that the physician is called upon to treat few conditions in which immediate accurate diagnosis and early correct treatment are so likely to save lives.

I have pleasure in thanking my Commanding Officer, Colonel R. E. Rees, for permission to submit this article for publication.

## CROHN'S DISEASE.

BY LIEUTENANT-COLONEL IAN FRASER,

*Royal Army Medical Corps,*

AND

CAPTAIN H. HAGGAR,

*Royal Army Medical Corps.*

[Received November 15, 1944.]

CASES of Crohn's disease appear to be increasing in frequency. Of the true pathology little as yet seems to be known and the causation still is covered by the unsatisfactory word "idiopathic." The presenting symptoms vary considerably and it seems difficult to foretell which cases will resolve and which will develop the serious complications of obstruction, perforation and fistula formation. Thus to describe any case as having classical symptoms is hardly accurate and yet the following case seems to fulfil so closely the postulates of Crohn that it seems worth recording.

*Case History.*—Sapper S. N., for the first time 9½ years ago, started to complain of abdominal symptoms. He was at that time 18 years of age and working as a cabinet maker. Suddenly, without cause, he developed diarrhoea with abdominal pain. This pain which was situated in the lower abdomen was very severe and was unaccompanied by vomiting. The pain itself was very severe. It doubled him up and he was unable to straighten himself. At the same time his motions varied from six to twelve per day. This attack lasted one week. Six to nine months later he had a further similar attack which persisted on and off for nine months. The frequency of stools varied very considerably but the intensity of the pain was what disturbed him most. His stools were consistently negative to all dysenteric organisms. He lost several stones in weight. His normal weight had been 10½ stones. His doctor's prescriptions of bismuth, etc., did not help his condition but spontaneous recovery took place and he had another period of twelve months when he was quite well again except for very minor attacks lasting only one or two days.

On the appearance of his third attack he was sent to his civilian hospital as a suspected colitis and was an in-patient for three months. He had the full gamut of investigation—fæces, sigmoidoscopy, bismuth enema, through-going barium meal, all with negative findings. He was passing some bright red blood but this was attributed to hæmorrhoids. He left hospital, he says, no better, very weak and he had lost any weight he had regained. At times his motions reached twenty per day, which left little time for cabinet making! This state of affairs continued until 1938, when again for twelve months he had a period of recovery and so was enrolled in the Army as A 1 in 1939.

He was in a Military Hospital in 1940 and again in 1941. He was admitted for fifteen weeks in 1942; again X-rayed, sigmoidoscoped, and the pathologist again supplied with numerous stools, all of which were negative. He left hospital in September, 1942, and was re-categorized B 1, and was actually put on a draft for overseas. At the last moment, as he was still having several motions per day, he was taken off the draft. He was posted to a series of units at home still with pain and diarrhoea persisting and in September, 1943, he was re-categorized C 2—permanent.

He now passed into the hands of the psychiatrist who said his "nerves were in a shocking state." This is not surprising if having twenty motions daily. From there he went from one job to another—clerk, storeman, etc., and finally was again admitted to a general hospital in May, 1944.

*Physical examination* revealed a miserable little man, age 28 years, but looking 20 years older and weighing 6 stones. He was having six to twelve motions daily, very severe pain and an irregular daily pyrexia rising to 100 to 102 with pulse 100 to 120. He was racially unfitted to bear pain and after 9 years it had started to show its effects and with each attack

of pain he cried out and demanded morphia or other analgesic. His abdomen was retracted and firm and, although no mass was palpable, tenderness was marked in both iliac fossæ and in the suprapubic region.

Repeated examination of his stools was negative and therefore one ruled out a chronic lesion of his colon. His blood was examined for possible agglutinins with negative results. This was carried out on account of his continued pyrexia. He was having urinary frequency and pain at the end of micturition and yet the daily twenty-four-hour quantity was normal and the urine was free from abnormal contents—thus suggesting a normal urinary tract with an extra vesical inflammatory lesion irritating the distending bladder and causing severe dragging pain as the bladder emptied. This fact was confirmed on rectal

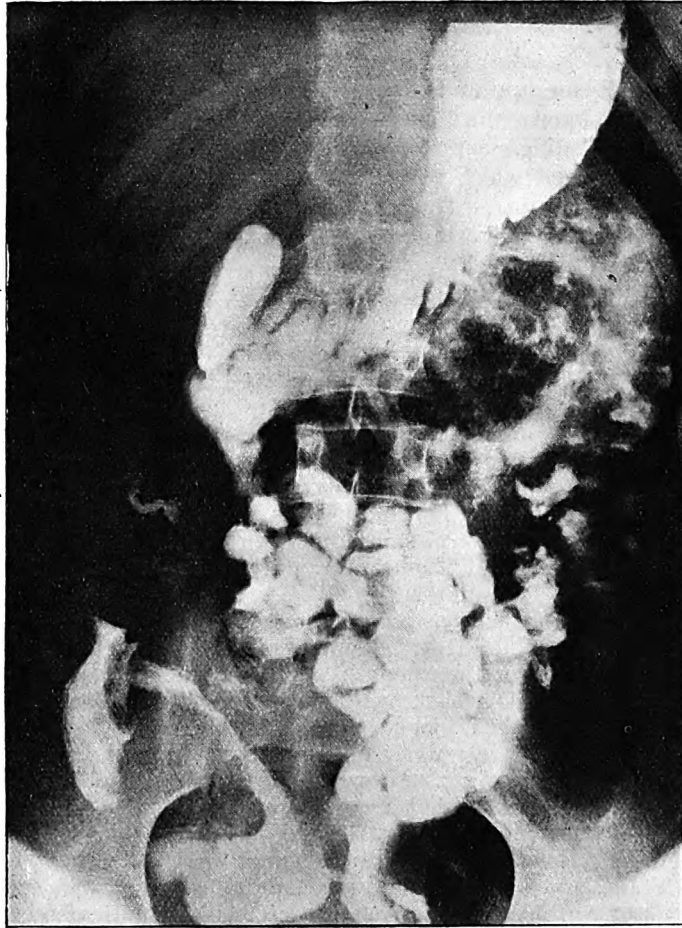


FIG. 1.—Cæcum starting to fill. Narrowing of terminal ileum. Some obstruction proximal to this in the pelvis.

examination by the presence of a very tender mass in the recto-vesical pouch. Abdominal tenderness was present across the lower abdomen and entrance to the false pelvis but neither ascending nor descending colon was tender or thickened. It was considered that the tenderness was due to a loop of terminal ileum inflamed and thickened that had fallen into the pelvis and was adherent to the posterior wall of the bladder and that a fistula with abscess had formed or was forming.

Sigmoidoscopy was not carried out at this stage but, some months before, it had shown a localized area of œdema of the mucosa at the recto-sigmoid junction—suggesting again the

presence of localized extramural inflammation. The fever throughout was irregular and not characteristic, rising to 101 to 102 with his pulse ranging from 100 to 120. Blood-count showed a secondary anæmia with hæmoglobin 77 per cent and white cells varying from 11,400 to 18,900. The through-going bismuth meal clinched the diagnosis. It showed the "string sign" of Crohn, marking the site of the terminal ileum and, equally important, that the last loop of the small intestine was fixed and immovable in the pelvis—tilting up the patient made no change in its position (fig. 1).

*Treatment.*—Operation was decided upon. The operation of choice was to be a right colectomy but it was envisaged that the loop of ileum might now be so fixed in the pelvis that removal would be impossible without damage to bladder or rectum. If this were so, what should one do? Short circuiting ileum to transverse colon and leaving this long loop either excluded or not excluded from the fæcal stream frequently does not give satisfactory drainage (a case so treated a few weeks previously and seen by one of us strongly confirmed this as the right colon became distended and had to have a cæcostomy performed leaving the field for the final resection a very unpleasant one).

It was decided, if the ileum could not be freed, to leave it *in situ* with both ends open and exteriorized, and at the same time to proceed to complete the right colectomy. Later after weeks of irrigation with saline, etc., and after the inflammation had subsided, one might attempt to remove this U-shaped loop from the pelvis.

In actual fact at operation the loop did separate. An abscess was found in the pelvis and a small sinus communicated with the ileum. This operation was not easy but a right colectomy was carried out. A drain was placed in the pelvis and post-operative convalescence was uneventful and straightforward. Much of the success of the operation was due to the satisfactory pre-operative, operative and post-operative resuscitation with blood, plasma, glucose-saline, etc., which the patient received from the transfusion officer, Captain (Miss) B. Winterton, R.A.M.C.

The specimen corroborated the known facts of Crohn's disease. (1) The thickened mesentery, one inch—with abscesses in it; (2) the disease stopping abruptly at the ileo-cæcal valve; (3) œdema and swelling more marked than fibrosis; (4) shortening and "concertinaing" of the affected gut; (5) adhesions and fistula.

The specimen measured about two feet when removed but when the mesentery was freed it measured about five feet. In fact, what is the length of the small intestine? The anatomy books state twenty-two feet and yet at times it is possible for a ten to twelve-foot tube to appear at the anus and still project at the mouth. The freeing of the mesentery gives an artificial idea of its length.

*Pathological Investigation.*—(1) Stools Culture (20 times): *B. coli.* and *Streptococcus faecalis*—tubercle bacillus not seen. Macroscopically: Loose, pale, foul smelling. No blood. No mucus. Microscopically: Pus cells, few monocytes and epithelial cells, no cysts or trophozoites of *Entamæba histolytica*. No helminthic ova.

(2) X-ray: (i) Pelvis, (ii) Chest, Nil.

(3) Urine: Nil.

(4) Blood-Count:	W.B.C.	11,400	18,900
	Neutrophils	74.5	71.0
	Eosinophils	0.0	1.0
	Basophils	0.5 later	0.0
	Lymphocytes	19.5	18.0
	Mononuclears	5.5	10.0

(5) Sigmoidoscopy: Œdema at recto-sigmoid junction.

(6) Blood Group: A.

*Report by Radiologist* (Captain H. Haggar, R.A.M.C.).—Barium Meal Examination: Stomach and duodenum were radiologically normal, but a radiogram taken two and a half hours after ingestion of the meal showed: (1) An irregular narrowing of the lumen of the distal foot of the ileum; (2) absence of normal segmentation of the involved ileum; (3) a coil of involved ileum lying in the pelvis (fig. 1). There was no dilatation of the small gut proximal to the diseased area.

Screen examination at this stage with the patient in various positions (prone, supine, head low, feet low) showed the loop of ileum in the pelvis to be firmly fixed. A further



radiogram taken after six hours showed a similar state of affairs, but in addition a poor filling of the cæcum (fig. 1). At twelve hours the small gut was empty and in twenty-four hours no trace was visible in the entire alimentary canal.

After operation the specimen was filled with barium solution and air, and a soft radiogram taken (fig. 2). The narrowed lumen and thickened wall is seen in detail. There is an enlarged lymph gland lying in the mesentery of the ileo-cæcal angle. It contains two small areas of calcification.

*Pathologist's Report upon the Specimen* (Major Winston Evans, R.A.M.C.).—(a) Macroscopic: The affected portion of the small intestine was about 15 inches long and extended to the ileo-cæcal valve. The cæcum was normal and the portion of small gut beyond the lesion was unaffected. The attached mesentery was much thickened and contained two large glands containing calcified matter. The peritoneal surface was engorged and showed

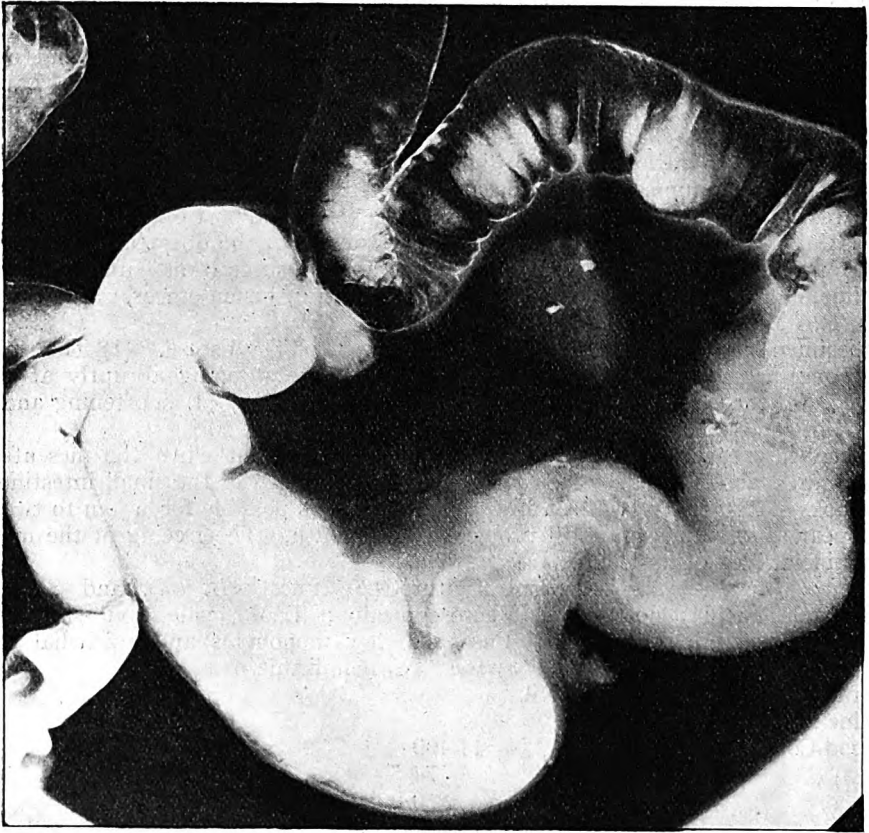


FIG. 2.—To illustrate the regional and terminal distribution of the disease. Proximal gut normal in texture and size. Appendix, although not seen in this, was normal.

a perforation where it had been adherent to the bladder. Section of the bowel wall showed it to be turgid, much thickened and hypertrophied with a tortuous and irregular narrow lumen. The mucosa and submucosa was thickened and oedematous with loss of intestinal folds and in parts ulcerated. In other parts the mucosa had been completely destroyed and replaced by a layer of atrophic epithelium. (b) Microscopic: Histological examination shows a chronic inflammatory process involving all the layers of the gut with a marked infiltration with plasma cell and fibroblastic reaction. The mucosa in different sections shows varying stages of destruction and is completely absent in some areas, a covering of epithelium remaining. The submucous lymph follicles are enlarged and some show an endothelial cell

proliferation. Giant cells systems are very scanty. There are no areas of caseation or focal necrosis.

Lymph glands show evidence of old tuberculosis with much fibrosis and a replacement of the remaining germinal centres by giant cell systems and focal areas of caseation.

#### SUMMARY.

(i) Details of a long-standing case of Crohn's disease treated by resection of terminal ileum and right colon are given.

(ii) Diarrhoea, abdominal pains, and loss of weight were the presenting symptoms.

(iii) The symptoms had persisted intermittently over a period of  $9\frac{1}{2}$  years.

(iv) The diagnosis was made on clinical examination, confirmed by the negative laboratory findings and clinched by the typical X-ray picture.

(v) Radiography of the resected specimen gives a good idea of the area involved, how contraction occurs in its length and how tight a stricture of the small intestine must be before obstructive symptoms appear.

The treatment of the above soldier was carried out in a General Hospital commanded by Colonel R. G. Shaw, M.C., to whom our thanks are due for permission to forward the case for publication.

#### REFERENCES.

- BURRILL B. CROHN *et alia* (1932). "Regional Ileitis." *J. Amer. Med. Ass.*, **99**, 1323-1329.  
KEIFER, EVERETT D. "Diagnosis of Regional Ileitis." *Surgical Clinics of North America*, **23**, 862.  
MARSHALL, SAMUEL F. (1943). "Regional Ileitis." *Ibid.*, **23**, 873.  
PRATT, F. W. M., and SIMPSON, S. L. (1942). *B.M.J.*, May 23, 634.  
GINZBERG, LEON (1942). "Regional Ileitis." *Annals of Surgery*, Dec., 906.
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## SOME SURGICAL ASPECTS OF THE AFRICAN SOLDIER.

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THESE observations are based on two years experience as Surgical Specialist and later as O.C. Division in Military Hospitals in East Africa, where the bulk of patients are native soldiers or Askaris.

It is a novelty for the surgical newcomer to see in his ward rows of shining black faces all turned expectantly towards him, with black shaved heads contrasted against the white bed linen. He is first at a loss and will remain handicapped till he has acquired some familiarity with the personality and background of the person whom he has to treat. The first essential in successful treatment of the African is to know something about him.

An initial problem is the language. The natives speak only Swahili and, till the newly arrived M.O. has learnt a smattering of this language, he is very much handicapped. But Swahili is not difficult to learn and with application sufficient is soon picked up to ask the usual questions. In surgery most of the conditions are self-evident such as tumours, traumatic conditions, herniæ, inflammations, etc., so that a simple history will suffice.

The Askaris are recruited from the villages in the hinterland and few have been in close contact with Europeans before. They are a fierce and war-like people as their record for many centuries has shown and, with training, they become first class soldiers. They fought remarkably well in the last war and in this war, in the Abyssinian campaign, and now they are taking their place in the fight against the Japs.

The native has natural good manners; he recognizes authority and is very obedient. He is proud of being a soldier and *esprit de corps* is high. It is not unusual to see him practising drill in his off-duty time so that extra drill as a punishment loses its effect as his friends standing by often take part too out of keenness. The Askari comes into the Service from a primitive background. Living in a mud hut with no furnishings except for a few skins on the ground as a couch and wearing only a loin cloth or an animal hide, he knows nothing of hygiene or sanitation. His diet consists mainly of *posho*—a ground maize meal, and vegetables, fruit and a certain amount of meat when he can get it. He attains wonderful physique and muscular development and is very energetic but, of necessity, in wartime the general standard of recruits is lower than in pre-war days. All Askaris look alike at first but distinctive individual and tribal differences soon make themselves apparent.

The African makes an excellent patient and most M.O.s and Nursing Sisters prefer treating him to the European when given a choice. The reputation of the European for fair dealing stands high with the native so that he places every confidence in the hospitals. He is very patient and uncomplaining and is inured to suffering and so does not make the frequent irritating demands on the medical and nursing staffs which sometimes make the European patient tiresome in the tropics. Operations are readily accepted for long experience has proved the benefits of them. Now and again one meets the African who refuses operation but, with tactful handling and reason, consent is usually obtained.

Practically all the diseases seen are organic but now and again one meets functional conditions. Malingerers do occur but they are usually not difficult to treat. The native mind is undeveloped, both by nature and lack of education, so that its approach to most problems is childlike. One therefore deals with the native as one would with a child. The complexes and inhibitions of civilization are absent so that psychotherapy often consists merely of a sympathetic unravelling of childlike troubles.

The Askari is so anxious to get well quickly that it is difficult to keep him in bed when he feels well enough to get up. For example, it is not unusual, in spite of warnings to the contrary, to see a herniotomy patient wandering out to the latrine a few days after operation. Fixation apparatus for limb fractures is occasionally found intolerable and I have seen Steinman's pins and plaster of Paris removed during the night. It is necessary to impress on patients, who have never slept in bed before and who are unused to idleness when they feel fit, of the necessity for lying in bed. On only two occasions have I heard an African express a desire to return to his native village for treatment by his own witch doctor rather than accept orthodox professional treatment. Both these cases were adamant and their complaints were of such a nature that they had to be boarded out of the Army. In East Africa the witch doctor is not as powerful a personage as he is in some other parts of Africa. Will-power plays a great part in the African's recovery. One sees patients who are desperately ill recover in spite of the odds against them and, on the other hand, patients who insist that they are going to die while suffering from a comparatively mild ailment and who do so in spite of all treatment.

In taking a history there are some minor difficulties. No African ever knows his age but, as all soldiers are young adults between 18 and 35, this is not important. He is also very vague about time. Perhaps one reason for this is the absence of seasons and the fact that the sun rises and sets at practically the same time of the day all the year round so that all days and seasons seem very much the same.

Many surgical conditions in the European are easily recognized by the contrasting colours of the skin, the erythema, early oedema of acute infections and the dilated bluish veins over neoplasms. A black crust over the crater of a boil with its red angry base stands out on a white skin. Such signs are by no means so obvious in the black African skin. The normal healthy African has a smooth shiny skin with a sheen like satin except for the legs which are coarse and roughened by sustained trauma and the ingrained dirt of going bare-footed. Nevertheless the African keeps his person very clean and washes himself all over on all possible occasions. Scars are not obvious in a black skin unless they are keloid, the tendency to which is well known in the African, but a thin scar can be recognized by its silvery colour and the harsh feel as compared to the surrounding smooth skin.

The surgical problems of the African are in many respects different from those of the European; many familiar conditions are rare and there are many unfamiliar ones which are common.

#### ABDOMINAL CONDITIONS.

In the Military Hospital at home appendicitis, perforated peptic ulcer and herniæ are the common abdominal diseases. The acute appendix is the usual emergency and perforated duodenal ulcer and a strangulated hernia are seen occasionally. In the Africans, strangulated hernia has the same incidence as in Europeans but the acute appendix and the perforated ulcer are rare.

In my two years' tour of duty in East Africa I had to deal with only two cases of acute appendicitis in Africans. But appendicitis must be borne in mind, even though it is rare, because malaria and dysentery often simulate it closely. A blood slide (taken as a routine for all hospital admissions), leucocyte count and, if time permits, stool examination are needed before the diagnosis of appendicitis is made.

The acute abdominal catastrophe in the African usually lies elsewhere than in his right inguinal fossa. It is possible that the rarity of acute and chronic appendicitis is due to the different diet and also to the fact that the squatting position for defæcation is adopted, a posture which may help to prevent fæces being squeezed into the closed and compressed appendix.

Volvulus is not infrequent, perhaps because the diet consists mainly of *posho* which is very bulky and is eaten only twice a day in large quantities. The result is that the enormously loaded small gut tends to twist on its mesentery particularly if a heavy meal is soon followed by exercise. Mesenteric thrombosis and death inevitably follow without early

operation. One case I saw had the whole of the small intestine from the duodeno-jejunal flexure down to the ileo-cæcal junction twisted upon itself. The whole bowel was gangrenous and the patient died soon after the unravelling.

Worms such as ascaridis and tænia may also cause obstruction and volvulus.

Africans on the whole tolerate abdominal operations very well.

#### LIVER ABSCESS.

Amœbic liver abscess is often seen. It comes on at any time after the dysentery. It is not easy to diagnose owing to the great variety of symptoms that it may produce. The typical cases present no great difficulty. There is epigastric discomfort, sharp stabbing pains in the hepatic area, intermittent temperature and sweating. The liver is enlarged, there is loss of weight and the leucocyte count is high.

Unfortunately all cases are not typical. In some instances the initial symptoms are much more urgent and the disease progresses or is so subdued that the diagnosis is missed until the abscess bursts into the lung or bowel or a fluctuating tumour presents in the right hypochondrium. Occasionally the diagnosis is only finally cleared up on the post-mortem table.

There is not one of the cardinal signs of liver abscess which may not be absent. There may be a normal temperature in a patient with a large collection of pus in the liver or temperature up to 104° may be observed. Painful swollen joints may occur and the cervical and axillary glands on the affected side may be enlarged. Sometimes the symptoms may be all referable to the chest, with a painful cough, shallow respirations, friction rubs and pneumonic signs at the right base. The significance of this basal pneumonia—a condition which often accompanies suppurative hepatitis—may be misinterpreted and so lead to an error in diagnosis. The fever may be put down to malaria which often co-exists and malaria is occasionally known to give rise to hepatitis of a non-suppurative character. Other conditions causing confusion in diagnosis are gall-bladder disease, subphrenic abscess following appendicitis or perforated peptic ulcer, syphilis of the liver, encysted empyema, right-sided pyelitis and perinephric abscess, suppurating hydatids, kala-azar, scurvy, undulant fever and ulcerative endocarditis.

The presence of *E. histolytica* cysts in the stool is suggestive but by no means conclusive of amœbic abscess. They are present in about half of the cases with an abscess.

Surgical treatment is necessary when one suspects that an abscess has formed. If medical treatment has given no relief it is necessary to locate the pus and evacuate it. In the first instance this is always done by means of the aspirating needle and the surgeon must be prepared to proceed forthwith with the operation of drainage.

#### PRIMARY CARCINOMA OF THE LIVER.

In England primary carcinoma of the liver is rarely if ever diagnosed. But it is not uncommon in the African. A patient with painless persistent progressive jaundice with enlargement of the liver almost certainly has a primary carcinoma of the liver. In the European with similar symptoms one would suspect carcinoma of the head of the pancreas. Exploratory operation reveals multiple malignant nodules scattered diffusely throughout the liver. The diagnosis of carcinoma of the liver can be made without hesitation in Africans with painless jaundice and in whom ordinary gall-bladder investigations have proved fruitless. Death ensues within a few weeks or months.

#### MALARIA AS A SURGICAL PROBLEM.

Malaria is a medical disease but the surgeon should be familiar with its relation to surgery. I have mentioned that all cases admitted to hospital, for whatever cause, have blood slides taken as a routine and this has proved of great help in a difficult case. The question of malaria arises in the following types of cases: (1) Those in whom it is not certain whether the patient is suffering from malaria or a condition requiring surgical treatment. (2) Those

cases known to have malaria and receiving treatment for it who develop complications of a surgical nature. (3) Cases admitted for traumatic lesions or undergoing surgical operation who develop malaria while in hospital.

In the first group are those cases of malaria which present as an acute abdominal emergency. The initial symptom is pain which comes on suddenly and is very severe. The pain may be localized to one particular region of the abdomen but more often it is generalized and comes on in sharp paroxysms with remissions. It may resemble a colic, either renal, intestinal or gall-stone. On examination the tenderness may be general or local but a distinguishing feature from a true peritoneal inflammation is that superficial palpation is more tender than deep palpation. This is a very important point in helping to decide on a given case. There may be local or general rigidity which fluctuates from board like rigidity to slight guarding but is not persistent and continuous as in a true abdominal condition. An enlarged spleen does not help for, in most Africans, the spleen is palpable owing to previous attacks of malaria. The patient himself is prostrated and looks ill. Fever is present and the pulse-rate may be slow or very fast. The bowels may be costive or diarrhoea may be present. Vomiting is often a symptom.

Depending on the site of the pain and tenderness and other symptoms the patient may present a picture either of acute appendicitis, perforated ulcer or acute gall-bladder disease. But there is something in the picture which does not properly fit into the diagnosis ; the pain is too sudden or too severe ; the tenderness and rigidity too marked or variable in intensity or location ; the onset either too gradual or too catastrophic ; and there are general symptoms such as rigors, headache and backache. Nevertheless it is often not easy to make up one's mind.

The second group comprises cases undergoing treatment for malaria which the surgeon is asked by his medical colleague to see. One must remember that quinine and mepacrine sometimes cause intestinal colic and abdominal symptoms suggestive of a peritoneal or bowel lesion. It is dangerous to conclude that because a patient has "proved" malaria it is impossible for him to have an abdominal condition as well.

The third group are those in which trauma, either accidental or surgical, precipitates an attack of malaria. Patients who have had the disease before may get another attack following any trauma, in spite of prophylactic quinine or mepacrine. Pain and hæmorrhage are aggravated by malaria.

Malaria is apt to follow fractures and injuries to joints in particular. The malaria parasites live in the bone-marrow and when the latter is damaged the parasite is released into the blood stream. This, coupled with the lowered resistance following an accident, induces an attack.

Cerebral malaria is extremely serious ; if it is not recognized and treated early it ends fatally. Should a patient with a head injury develop cerebral malaria he is indeed in a perilous state for the cerebral symptoms may be put down to the injury whereas the parasite may be wholly or partly responsible.

Another unfortunate combination is that of blackwater fever with an injury which may have caused damage or suspected damage to the kidneys. The dark urine of blackwater fever may be thought to be due to the passing of old blood and its true cause not suspected. The microscope may assist by revealing the presence or absence of red blood cells. Even with energetic medical treatment cerebral malaria and blackwater fever both carry a high mortality.

#### FILARIASIS.

Filariasis is due to the invasion of the lymphatic system and connective tissues by certain nematode worms. The adults of both sexes of these worms find their way from the lymphatics and connective tissues into the blood stream where they are capable of living for a considerable time without further development. The most important of these worms is the *Filaria sanguinis hominis* (bancrofti) because it lives principally in the blood of man. The parent filariæ are long hair-like transparent nematodes 2 in. to 3 in. in length and the two sexes live

together coiled intimately about each other. They may be found in bunches tightly packed together in cyst-like dilatations in the distant lymphatics or, more loosely, in lymphatic varices or in the large lymphatic trunks between the glands, in the lymphatic glands themselves or even in the thoracic duct. The adult female gives birth to an unending stream of living embryos or microfilariae which are carried in the blood where they can be found on examination as snake-like organisms constantly wriggling. If the blood of the patient is examined in the daytime the microfilaria is rarely seen but, towards evening, it appears in gradually increasing numbers reaching a maximum between the hours of midnight and 2 a.m. and decreasing towards morning. This is called *Filarial Periodicity*. Blood slides must be taken at 2 a.m. to search for their presence. Microfilariae are destroyed in the substance of the lymph glands and so cause changes there; while the adult worms during life and after death (because of calcification) cause obstruction of the lymph vessels and so contribute towards lymph stasis. During their temporary absence from the general circulation in the daytime the microfilariae retire to the large arteries and the lungs. The intermediate host is the mosquito: *Culex*, *Aedes* and *Anopheles*.

There are two main types of disease caused by the presence of the filaria in the lymphatics, one characterized by varicosity of the lymphatics and the other by more or less solid oedema. When the lymphatics become obstructed a compensatory lymphatic circulation eventually becomes established with a dilatation in the distal area. This leads to lymphatic varices of various kinds. When the thoracic duct is the seat of obstruction the abdominal and pelvic lymphatics and those of the groin, scrotum and abdomen are affected. The result may be a "lymph scrotum" when the scrotal skin is involved or "varicose" groin glands when the groin glands are involved.

When the lymphatics of the bladder and kidney become over-distended and rupture, chyluria results; when those of the tunica vaginalis rupture, hydrocele due to chyle is seen; and, in the peritoneum, chylous ascites occasionally occurs. Large groups of varicose glands are present in the axilla, groin or upper part of the thigh. Other conditions caused are lymphangitis, synovitis, superficial and deep lymphatic varix, funiculitis, orchitis and elephantiasis of the scrotum, arm and leg. The worm may be killed by injury or through other causes and will then act as an irritant and give rise to abscesses which occur in the limbs or in the scrotum and may require incision. Such abscesses are not to be confused with pyomyositis of which more will be said.

Varicose groin glands are very important to the surgeon. The patient is, as a rule, unaware of their presence until they reach a fair size. They appear as soft swellings up to the size of a large orange, often bilateral, and the inguinal group alone or femoral group or both may be involved. They are easily mistaken for hernia. The essential differences are that they reduce slowly on lying down and not rapidly as in hernia, there is no gurgle and no impulse on coughing or perhaps a very slight one. When the patient stands up the swelling slowly reappears if pressure is applied over the inguinal and saphenous openings.

Filarial orchitis, funiculitis and hydrocele may co-exist or each may be present alone. The orchitis eventually is accompanied by a hydrocele. The swollen testis has to be differentiated from testicular enlargement, due to other causes, syphilis, gonorrhoea, tuberculosis and *B. coli*, etc. Filarial infiltration of the cord may be a generalized or a localized swelling. There may be a single nodule the size of a pea or a large number of them causing a nodular irregular thickening of the whole cord. The nodules may be hard or there may be a group of soft swellings—lymphatic varicoceles—or even a large cystic dilatation—lymphocele. The spermatic veins are often the seat of chronic thrombo-phlebitis. The fluid removed by tapping the hydrocele is cloudy and on examination shows a number of polymorphs and red cells with microfilariae inside. The tunica vaginalis shows nodules in its walls containing calcified remains of adult filaria in many cases.

Synovitis of the knee as a symptom of filariasis is very common in Africans. There is no history of injury or strain and the patient presents himself with temperature, effusion into

the joint and later thickening of the synovial membrane and peri-articular tissues. The swelling recurs without any definite cause.

Early elephantiasis only is seen in the Army but gross elephantiasis of the scrotum and limbs are seen in the civilian population.

#### ONCHOCERCIASIS.

The *Onchocercus volvulus* is morphologically similar to the *F. bancrofti* and it gives rise to subcutaneous fibrous tumours, varying in size from a marble to a hen's egg, which are hard, painless, fairly movable and lie just under the skin. Common sites are the chest wall, popliteal space and around the elbow. The intermediate host is a species of sandfly or buffalo-gnat. The tumours when first seen are thought to be fibromas but one soon learns to recognize them and diagnose them correctly. They are treated by excision and the swelling is found to consist of an outer thick firm fibrous capsule containing yellowish fluid and the coiled worm.

#### GUINEA-WORM (*D. medinensis*).

This is a very important cause of invalidism and hospitalization among African soldiers. The patient presents himself either with diffuse cellulitis of the calf or else he has a long wavy serpentine "cord" lying just under the skin of the leg something like a varicose vein. This is due to the guinea-worm.

The female guinea-worm enters the intermediate host—the water-flea or *Cyclops quadricornis*. The water-flea is then swallowed in drinking water and the hydrochloric acid of the stomach kills it. The larvæ escape and make their way into the tissues. They take about a year to reach the reproductive stage and the resulting embryos have to escape into water. In order to accomplish this, the adult female makes her way down the lower limb of the patient. She comes to the surface of the limb and lies under the skin where she is visible as a serpentine cord. She breaks through the skin causing a blister which ruptures with the escape of a little milky fluid. The worm then protrudes just through the skin surface and liberates embryos. In order to extract the worm from the tissues, a match is tied to it and pulled gently a little at a time each day. The application of cold water hastens and encourages the process. By daily traction the worm can be wholly removed; it may be as much as four feet in length and as thick as a violin string. If it is broken off by too harsh pulling the young are evacuated from the broken worm into the tissues and a severe abscess results.

#### PYOMYOSITIS.

A number of patients are admitted to hospital ill with fever, general malaise and complaining of deep seated pain in the thigh, calf, buttock or shoulder. The history is of a few days' duration and deep palpation of the affected part elicits exquisite tenderness. The tenderness is such that the patient barely allows the part to be touched at all. The general appearance of the part may show only a slight fullness compared with the other side. The patient looks and feels ill. His leucocyte count is raised and X-ray of the limb shows no bony change. The case is one of pyomyositis, an abscess in the deep muscles. Fluctuation is rarely seen and if the nature of the case is in doubt and treatment delayed the abscess gradually tracks up to the surface when the overlying skin becomes brawny and oedematous. Aspiration may be done but, usually, once the cases are recognized, incision is carried out. Skin and fascia are incised and the underlying muscle fibres split following the clue of oedematous or indurated tissues, if present. A sinus forceps is pushed through the incision, if necessary to the full length of the blades. A sudden large gush of pus under tension shows that the abscess has been found. The opening is widened with the finger or scalpel if need be and the abscess cavity is laid open. Sometimes these abscesses track up and down a limb close to the shaft of the bone. The most common sites for pyomyositis are the thigh muscles, the glutei, adductors and pectorals, biceps, deltoid and forearm flexors. The organism in all cases is the staphylococcus. Healing is usually rapid once good drainage is established.



Multiple abscesses occur in about 25 per cent of cases and of these a small percentage develop pyæmic abscesses with a fatal result. Chemotherapy is of great assistance in these multiple and pyæmic cases. The ætiology is obscure. One can postulate a staphylococcal infection from the blood stream into a hæmatoma or bruise, due to trauma or scurvy. Investigation of a number of cases of pyomyositis reveals *F. bancrofti* in the blood but the majority of patients do not harbour it. The condition is one peculiar to the African ; Europeans in the tropics rarely, if ever, suffer from it.

#### SUMMARY.

- (1) An account is given from the surgeon's point of view of the African as a patient and some of the surgical problems he presents.
- (2) Abdominal conditions peculiar to the African are described including an account of liver abscess.
- (3) The relationship of malaria to surgery is discussed.
- (4) Filariasis and pyomyositis are briefly considered.

## GONORRHOEA IN ITALY

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THIS communication gives an account of some of the difficulties encountered in the treatment of gonorrhœa in the British Army in Italy. It is a record of the failure of sulphonamide therapy. Various interesting outlines of the subject have already appeared in Medical Journals, particularly an article by Campbell, and an Editorial on the subject of sulphonamide resistance, in the June, 1944, number of the R.A.M.C. Journal. Sulphonamide-resistant gonorrhœa had already been encountered in Sicily and in North Africa (Cronin). In Italy, only 25 per cent of patients were cured by a single course of sulphonamide, reckoning 25 to 30 grams as one course. All types of sulphonamide were equally disappointing.

The accumulation in hospitals of chronic cases of gonorrhœa presented a problem of considerable importance. In some hospitals this seriously interfered with the activities of other departments. For some months, at the outset of the campaign, the problem baffled both the clinician and the medical administrator. This was further complicated by the misfortune that there were too few venereologists to carry the burden and a very high incidence of venereal disease among the troops generally.

Typical of the history of many V.D. clinics was that of a 100-bed unit in a metropolitan area. During November and December, 1943, the monthly admission rate of all V.D. patients to this unit was 1,500. This represented more than 1,000 cases of gonorrhœa to be treated each month. Under such circumstances a quick turnover was essential but, in fact, each patient spent an average of five weeks in hospital.

In an effort to combat the menace, every form of sulphonamide was tried, every type of ancillary treatment was experimented with, every fashion found a place and a backer. The results were the same everywhere. Gonorrhœa patients threatened to choke the hospitals.

The analysis which follows is derived from 500 cases, which are divided into three groups.

(1) Group 1 represents a sample of the most chronic cases in Western Italy. It consists of 100 cases, which are analysed to show their condition prior to being selected—and rescued—to undergo experiments with penicillin. Selection was made rather on account of chronicity and sulphonamide resistance than on account of complications. The group represents some 15 per cent of the total gonorrhœa cases in the clinics from which selection was made.

(2) Group 2 consists of 100 cases which were chosen from one clinic of which they formed some 30 per cent of the total gonorrhœa cases. The statistics show the condition of this group prior to the exhibition of penicillin. Their "rescue" came earlier than that of the cases in Group 1, because the military situation was such that hospital beds required to be cleared very quickly. The analysis of this group merely substantiates the evidence of Group 1—but to a less striking degree—that chronicity and sulphonamide resistance were severe.

(3) Group 3 consists of 300 patients who were not treated with penicillin and the analysis is made in percentage figures. All the cases in this group presented themselves for final test of cure. They had been treated in various clinics in Italy and by a variety of methods. Selection was made at random. Their period of treatment covers the months between November, 1943, and May, 1944. Since penicillin was being used to treat sulphonamide-resistant cases during the last three months of this period, many chronic cases which would otherwise have found a place in this group had been extracted to undergo penicillin treatment. Hence the figures for the group should give a picture a little more flattering than the truth of the average.

*Group 1.*—(a) The number of courses of sulphonamide used is shown in fig. 1. The figure shows that 76 per cent of the patients had received three or more courses of sulphonamide prior to treatment with penicillin. It is interesting to record that the official directive to medical officers in the early months of the Italian campaign had advised that gonorrhœa cases should be treated on duty with sulphathiazole, 10 g. in two days (Campbell).

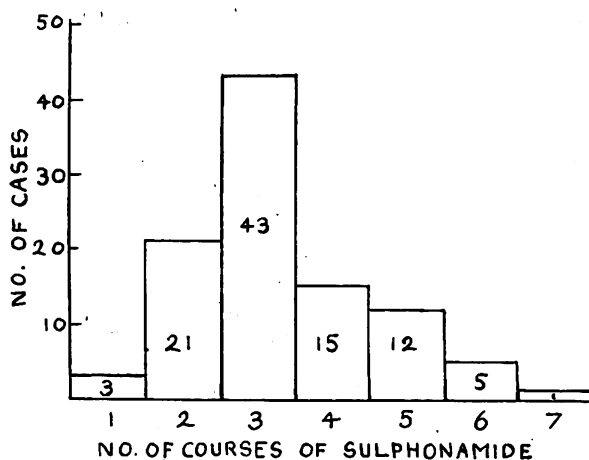


FIG. 1.

(b) The time each patient occupied a hospital bed is illustrated diagrammatically in fig. 2. The average was nine weeks. Penicillin cured 98 per cent of these men in as many days, and if it had been available for each case at first diagnosis the saving to the Army would have been some £30 per head. In these 100 cases, then, sulphonamide had been almost useless.

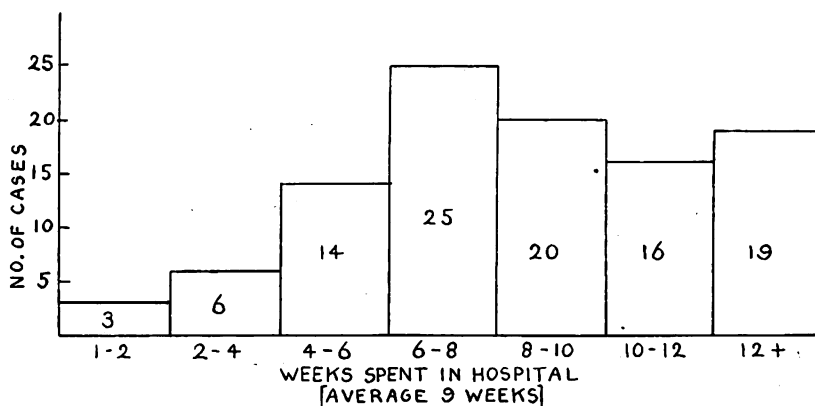


FIG. 2.

(c) The complications met with are tabulated. The list reveals the curious fact noted elsewhere (Campbell) that complications were local and not systemic.

Prostatitis (acute)	..	..	..	..	..	0
Prostatitis (subacute or chronic)	..	..	..	..	..	52
Vesiculitis (all stages)	..	..	..	..	..	11
Epididymitis (acute)	..	..	..	..	..	4
Epididymitis (subacute or chronic)	..	..	..	..	..	17
Peri-urethral abscess	..	..	..	..	..	2
Tysonitis, or peri-urethral duct infections	..	..	..	..	..	3

Only 10 cases were apparently uncomplicated and only one showed signs of sulphonamide poisoning. The rarity of acute complications is explained by the fact that the assessment was made just prior to treatment with penicillin, when acute lesions had, for the most part, passed into the chronic stage after weeks in hospital. It was characteristic of the Italian disease that complications were the rule rather than the exception and this was in no way the result of over-meddlesome treatment. Patients would develop complications in a most disconcerting way during a course of sulphonamide, while they lay in bed at rest and free of all interference by local treatments or digital and instrumental investigation. It is little wonder that some medical officers attempted to explain such a common phenomenon by postulating that the gonococcus was in itself hyper-virulent.

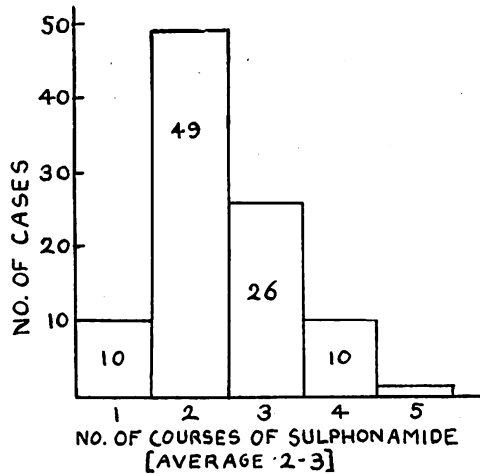


FIG. 3.

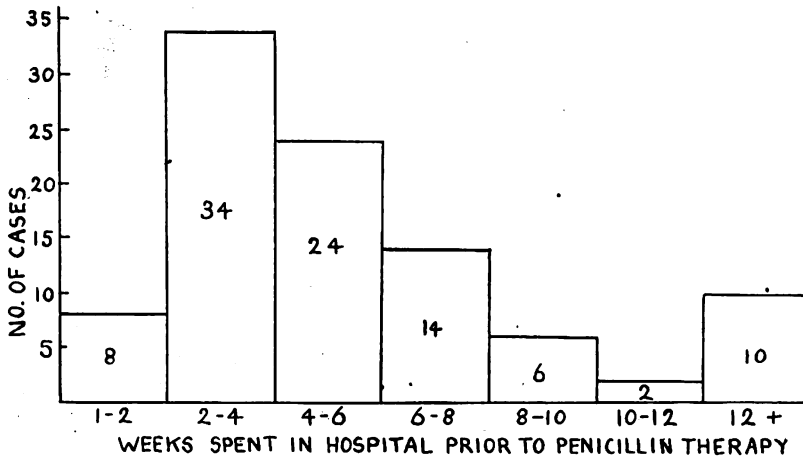


FIG. 4.

In the table on page 22 only major complications are recorded where more than one complication occurred in the same case. Among the minor complications were a variety of "old-fashioned" conditions which were interesting but not serious. Such were gross œdema of the prepuce, lymphangitis of the penis and painful inguinal adenitis, sangro-purulent discharges, and peri-urethritis generally; conditions which are thought to be associated with a severe type of infection (Pelouze), (Fontana).

*Group 2.*—The number of courses of sulphonamide and the period spent in hospital prior to the penicillin treatment of this group are set out in figs. 3 and 4. The shift to the left which has occurred, as compared with figs. 1 and 2, is entirely due to the earlier exhibition of penicillin in these 100 cases. The complications encountered show little divergence from the characteristics of Group 1 and are therefore omitted.

*Group 3.*—The analysis of this group shows the number of courses of sulphonamide used, the period of stay in hospital, etc., but in addition the inquiry gives information regarding the number of relapses after sulphonamide treatment, the condition of patients at final test of cure and the incubation period of the disease.

(a) The incubation period was known in 80 per cent of cases. The average period was six days, but most cases distributed themselves more or less equally over the period three to seven days inclusively. There was nothing unusual, therefore, in the incubation period.

(b) The number of courses of sulphonamide used is shown in fig. 5. The average lay between two and three courses, and only 25 per cent of patients were apparently cured by one course (*cf.* Campbell). For interest, a calculation of the number of relapses after sulphonamide was made, and this is set out graphically in fig. 6. (For the sake of clarity the number of relapses has been taken to signify the number of courses of sulphonamide throughout which the gonococcus persisted.)

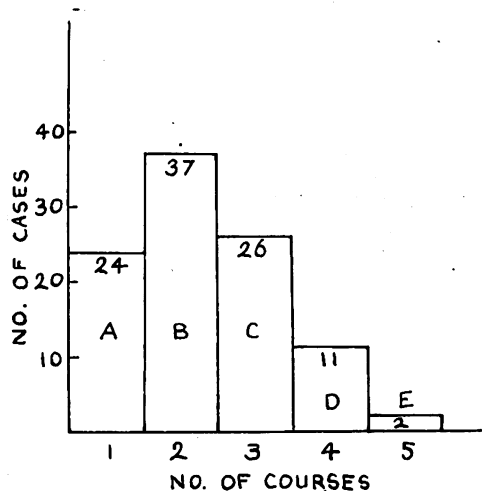


FIG. 5.

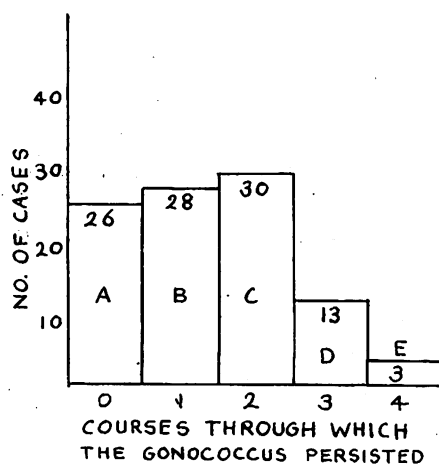


FIG. 6.

Theoretically, columns A, B, C, D, E of fig. 6 should be identical with columns A, B, C, D, E of fig. 5 if sulphonamide were continued course after course until the urethral smear was free of the gonococcus. Thus if 28 per cent of cases failed after one course (col. B, fig. 6), one would expect 28 per cent cases to receive two courses (col. B, fig. 5). In fact, 37 per cent were given two courses. Probably, then, this 9 per cent were given their second course on account of a persisting non-gonococcal discharge. Similarly 30 per cent failed to be rid of gonorrhœa after two courses but only 26 per cent received three courses (col. C). In 4 per cent of these patients, therefore, the medical officer considered it futile to persevere beyond two courses. The same applies to columns D and E. On the whole, however, less than 10 per cent of cases received sulphonamide for other reasons than the persistence of their gonorrhœal infection. Thus, the tables illustrating the number of courses of sulphonamide used (figs. 1, 3, 5) give a true indication of sulphonamide resistance and not of sulphonamide wastage.

(c) The average time a patient remained in hospital was five weeks. This figure was

found to be more or less constant in V.D. clinics in various localities. The analysis of this period spent in hospital is shown in fig. 7.

Such an average of five weeks is comparable to the state of things in the last war, before sulphonamide had been dreamt of. The figure for Palestine and Egypt in 1940 was ten days, and the figure for Tripoli in 1943 was fourteen days. A glance at fig. 7 reveals that 17 per cent of patients remained in hospital for more than two months.

(d) The complications which occurred are listed thus (total of 300):—

Prostatitis (acute) .. .. .	5 (1·7 per cent.)
Prostatitis (subacute or chronic) .. ..	140 (47 per cent.)
Vesiculitis (all stages) .. .. .	2 (0·7 per cent.)
Epididymitis (acute) .. .. .	12 (4·0 per cent.)
Epididymitis (chronic) .. .. .	6 (2·0 per cent.)
Peri-urethral abscess .. .. .	1 (0·3 per cent.)
Tysonitis, or para-urethral duct infection ..	4 (1·3 per cent.)
Œdema of penis .. .. .	3 (1·0 per cent.)

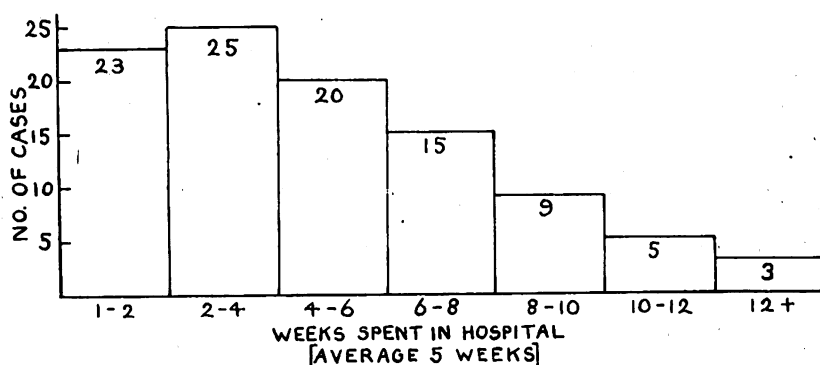


FIG. 7.

Apparently 127 cases (42 per cent) were uncomplicated. Comment must be made concerning the figure of prostatic involvement, 47 per cent being too low an estimate. Many medical officers, following out more orthodox teaching, were unwilling to examine the prostate gland during a patient's surveillance period, so that many a case of prostatic involvement went unrecorded in the material from which the above figures were drawn. Personal observation of his own cases convinced the writer that seven out of every ten of his patients had suffered some degree of prostatic inflammation. So true is this that where a patient was cured with one course of sulphonamide, subsequent examination failed to show abnormality in the prostatic smear, but where a patient resisted one or more courses of sulphonamide he exhibited an abnormal prostatic smear, apart from any more serious complication he may have suffered. With some few exceptions this relationship between sulphonamide resistance and posterior urethral complication held good. Assuming the truth of this observation, the one characteristic of the Italian gonorrhœa was the high proportion of early complications.

(e) The conditions found at final test of cure, after a minimum surveillance period of three months, were disappointing. Almost 10 per cent of candidates were found unsatisfactory, 7 per cent on account of persisting prostatitis and 3 per cent on account of urethral stricture of mild degree. In no case, however, was the gonococcus found in the prostatic-vesicular smear. An analysis of 70 cases of prostatic infection which were carefully followed-up revealed that it required seven or eight weeks after discharge from hospital before the prostatic smear returned to normal. It seemed immaterial whether the original prostatic infection was gonococcal or non-gonococcal. This period is not unusually long.

It was noted at final test of cure that T.A.B. shock therapy had been employed in 40 per cent of all cases to reinforce sulphonamide.

## COMMENTARY.

The figures quoted above reveal that the type of gonorrhœal infection acquired by British troops in Italy was characterized by a high rate of local complications and by sulphonamide resistance. This has given rise to a good deal of comment already and to much speculative thinking. The subject is well discussed in a recent Editorial of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. The writer himself believes that the organism was one of unusual virulence and that this was responsible for the frequency of complications seen among men presenting themselves for the first time at hospital.

According to the Italian specialists, the disease in Italy was resistant to sulphonamides for long before British troops came to the peninsula. They agree that under stress of war conditions treatment of both men and women was often inadequate, mainly because of shortage of supplies of sulphonamide drugs, and that treatment by drug stores was common. Prostitutes were known to treat themselves. And yet in Eritrea, some years before, where these conditions also obtained, gonorrhœa was not sulphonamide-resistant. But Eritrea never suffered such destitution as the population of Italy itself.

On the fact of virulence Italian doctors held divergent views. Most agreed that the disease had become more virulent during the years of the German occupation. They believed this was the result of the swift spread of the disease through a new and hitherto uninfected section of the community. Destitution, which had been on the increase during these years, had reached tragic proportions when the Allies assumed the responsibilities of civil administration. Prostitution had developed on a scale hitherto unknown. To buy a loaf of bread in the black market cost twice an artisan's daily wage. Conditions of semi-starvation literally drove women into the streets. Unfortunately this is a situation which may have to be faced again in other countries of occupied Europe.

## SUMMARY.

(1) This paper describes the unusually severe type of gonorrhœa met with among British troops in Italy.

(2) Evidence is produced to show that the disease was resistant to sulphonamides to a degree hitherto unknown.

(3) Comment is made regarding this resistance, the possibility of hypervirulence, and the opinions of Italian medical men on these subjects.

*Acknowledgments.*—(1) Brigadier Robert Lees, Consultant in Venereology, for constant encouragement and permission to forward this paper. (2) Colonel G. T. Gimlette, Commanding a General Hospital, for permission to forward this paper. (3) Captain A. E. Wilkinson, R.A.M.C., for his methodical examination of the majority of the cases. (4) Lieut.-Colonel P. Wood, R.A.M.C., for his revision of these notes.

## REFERENCES.

- CAMPBELL, D. J. (1944). *B.M.J.*, No. 4357.  
 CRONIN, E. (1944). *Journal of the Royal Army Medical Corps*, **82**, 6.  
 EDITORIAL, *Ibid.*, **82**, 6.  
 FONTANA, A. "Sifilide e Malattie Veneree," pp. 288-290. (Unione tipografica; editrice Torinese; 1942).  
 PELOUZE, P. S. "Gonorrhœa in Male and Female" (W. B. Saunders, 1943).

# TRAUMATIC RUPTURE OF MALARIAL SPLEEN.

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[Received September 14, 1944.]

*History.*—L/Cpl. F. R. W., aged 26, arrived in India from England in September, 1942. About a month afterwards he suffered from "shivering attacks," "sweats" and diarrhoea. After three months he was moved to Basra and later to Iraq. During the following year (November, 1942, to September, 1943) he suffered from periodic "hot and cold shivering attacks." In the autumn of 1943 he took part in the landings at Salerno and Anzio but still suffered from periodic shivering attacks in the morning but always felt perfectly well again in the afternoon. He remained on duty most of this time except for about a month (November, 1943), when he was treated in a Field Ambulance where he received "injections" and had quinine treatment for malaria. After discharge he took tablets for another week.

On arrival in Egypt in April, 1944, he again had shivering attacks and "cold sweats" and, though the weather was quite hot at this time, he had to wear his overcoat during the attacks to keep warm.

On May 17, 1944, at about 9.45 p.m., he was returning to his tent in the dark when he tripped over a tent peg. He tried to save himself from falling but, in so doing, twisted his body and fell backwards on to another tent peg. This struck him in the left loin in the region of the tip of the last rib. He lay on the ground afterwards because he felt "winded" and could not get his breath for a minute or two. The two friends who were with him helped him to his tent. He went to bed and slept soundly that night. Next morning he felt "shivery" but did not think seriously of this as he had felt the same on the previous four mornings. He remained on duty during the next three days (May 18, 19 and 20), but on the second day he had "pains shooting through each shoulder like needles." On the fourth morning (May 21) he could not raise his shoulders from the bed. When he contracted his abdominal muscles, even to raise his head, he felt severe pain all over the abdomen and lower part of the chest. He also felt pain on the tip of the shoulder and infraclavicular and supra-scapular regions. Later whenever he moved any part of his body he felt severe abdominal pain. Finally a colicky type of pain ensued and recurred in attacks about once every minute even when he was lying still. At 11 p.m. he vomited yellowish clear fluid which was mixed with flakes of blood. He was helped again by his two friends to the M.I. Room. Periodically, on the way and while he was sitting there, "everything went black" and he believes he fainted three or four times. He felt thirsty and took copious drinks of water. He received an injection into the arm to "stop the pain" and was then transferred to hospital, arriving there in the afternoon of May 21.

*On Examination.*—The patient was pale, sweating, anxious and restless. His pulse was rapid and the volume weak. Temperature 101°. His breathing was shallow and each breath appeared to cause pain. His tongue was dry and coated. The abdomen moved little on respiration and appeared to be slightly distended. There was generalized tenderness over the abdomen though the maximum tenderness appeared to be in the hypogastrium. Liver dullness was reduced along the right nipple line. There was dullness in each flank. No abnormal constituent was present in the urine. A blood smear, examined soon after admission, showed the presence of B.T. malarial parasites in large numbers. Hæmoglobin 75 per cent.

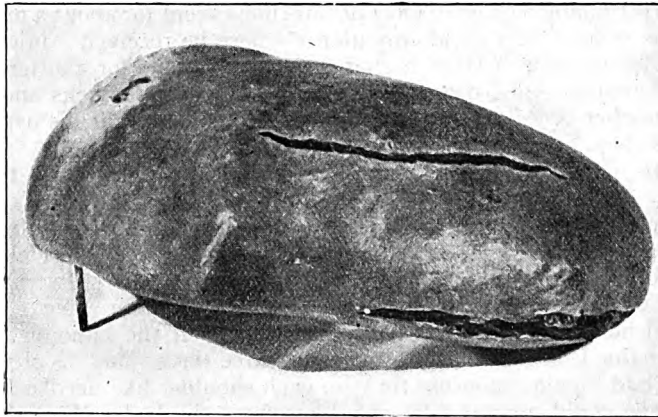
*Operation* (At 4.15 p.m., May 21, 1944).—Gas, oxygen, ether (Major H. Bereen, R.A.M.C.). A cannula was inserted into the left long saphenous vein at the ankle and a saline drip infusion started.

The abdomen was opened by a right paramedian incision, with the umbilicus opposite the centre of it. When the peritoneum was opened fresh and altered blood with clots welled up through the opening. The incision was enlarged upwards to within 1 in. of the xiphisternum. About two pints of old blood had collected between the costal margins and the liver in the pelvis and in Morrison's gutters. The spleen was felt to be soft and at least three times normal size; it was adherent to the diaphragm behind; no rent was, at this time, felt in its surface. The liver, stomach, colon and kidneys were found to be intact. It was decided to



inspect the spleen and, after separating the diaphragmatic adhesions, it was delivered into the wound. Two small parallel tears were found on the outer surface each about 3 in. long and oozing bright blood; a thin film of soft clot lined the tears. No subcapsular hæmatoma was seen. The spleen was removed after dividing the pedicle. Considerable oozing was now observed from the divided diaphragmatic adhesions. Ligatures were placed upon some of the larger bleeding points and the residual oozing was controlled by a loose gauze pack. Most of the remaining clots and blood were removed from the pelvis and the abdomen was closed after inserting a tube alongside the gauze towards the left loin. While the operation was in progress stored blood was transfused through the cannula.

The pulse before leaving the theatre was 116 and of considerably better volume than before the transfusion and operation started. A slow blood drip continued until 8.30 p.m. when two pints had been transfused and the hæmoglobin was 95 per cent.



Spleen removed from Lance-Corporal F. R. W. showing two fissures 3 inches long,  $\frac{1}{4}$  inch deep in the outer surface. The spleen was more than three times normal size—weighed 630 grammes and was soft and friable. Histological examination showed malarial changes—B. T. rings and gametocytes.

*After-Treatment.*—The patient was gradually propped up into Fowler's position and breathing exercises and inhalations of menthol and Friar's balsam were started next morning. Despite these precautions, consolidation occurred in small areas at the base of each lung and pyrexia varying between  $99^{\circ}$  and  $101^{\circ}$  continued for eight days. The lung condition improved after a four days' course of sulphathiazole. The gauze was shortened after forty-eight hours and removed under a short intravenous pentothal anæsthesia on the third day. The tube was shortened on this occasion but not removed until the next day. A course of quinine hydrochloride, gr. x t.d.s., was given during the first week after the operation and, after five days rest, a course of mepacrine (0.1 g. t.d.s.) was administered for one week during the convalescent period.

*Pathological Report on Spleen* (Major A. W. Morgan, R.A.M.C.).—Macroscopic: The spleen is evenly enlarged; is  $6\frac{1}{2}$  in. in its largest diameter;  $4\frac{1}{2}$  in. broad and  $1\frac{1}{2}$  in. thick. The weight is 630 grammes (normal is 170). Over the diaphragmatic surface and along the anterior borders are two tears in the capsule about 3 in. long and  $\frac{1}{4}$  in. deep.

*Histology.*—The pulp is more cellular than normal, contains a moderate amount of hæm-zoin and shows numerous B.T. rings and gametocytes.

*Progress.*—After the wound had healed the patient was entertained, during his convalescence, on the Gezira Houseboat. He was finally evacuated to the United Kingdom on June 28, 1944, free from symptoms.

#### COMMENT.

Minor trauma, falling on a tent-peg, caused the rupture of a soft friable malarial spleen. Bleeding occurred from two small lateral tears into the peritoneal cavity. This bleeding was so slow that natural compensation for blood-loss was capable of masking its effects for four days. After this, the collection of blood in the peritoneal cavity (about two pints) caused a peritoneal reaction resembling a peritonitis. Removal of the blood and source of hæmorrhage relieved the patient.

# MALARIA AND THE SEROLOGICAL REACTIONS FOR SYPHILIS IN BRITISH SOLDIERS.<sup>1</sup>

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AND

BRIGADIER G. M. FINDLAY.

[Received August 1, 1944.]

THE discovery that malaria is capable of inducing apparently positive serological reactions for syphilis in the serum has given rise to a number of investigations. Conflicting results, however, have been recorded and, by employing different techniques, varying numbers of positives have been obtained from the same sera (Harmsen and Hauer, 1943, Kaplans and Brightman, 1943). In addition it has been found that the species of parasite is of importance, *Plasmodium vivax* being more likely to produce positive reactions than *P. falciparum* (Kitchen *et al.*, 1939). *P. vivax* is also more active in this respect than *P. malariae*. A further difficulty in assessing the true importance of positive syphilitic reactions in the sera of patients with malaria lies in the fact that much of the work has been carried out either on patients whose previous history did not entirely exclude syphilis or on non-syphilitic psychoneurotics in whom malaria had been induced for therapeutic purposes.

Comparatively few observations have been made on persons living in hyperendemic malaria zones who, despite the taking of suppressive drugs, have succumbed to a clinical attack of malaria.

In attempting to assess the extent of syphilis in a malaria-ridden community Fellows and Perry (1941) working in North Carolina have pointed out that false positives due to malaria may vitiate the results. Possibly in West Africa, where among the native population the finding of a positive Kahn is invariably attributed to antecedent yaws or syphilis, chronic malaria may play some part in causing the high rate of positive serological reactions.

In the British soldier the finding of a positive Kahn may easily lead to a course of anti-syphilitic treatment. It therefore appeared to be of interest to determine whether British soldiers without a history of syphilis but suffering from malignant tertian malaria and resident in a hyperendemic area would show a positive reaction when examined by the Kahn test as carried out by the standard technique used in British Army laboratories.

The patients were all young British soldiers who had not been more than eighteen months in a hyperendemic malarial zone; there was no previous history of syphilitic infection in any case. The Kahn reaction was carried out by the standard technique used in Army laboratories; the first test was usually made within twenty-four hours of the demonstration of *P. falciparum* in the blood. At least two subsequent tests were planned but owing to troop movements it was often difficult to obtain blood samples after the patient had once left hospital.

At the same time as the Kahn reactions, Ide tests were carried out.

The results show that of 80 patients, 23 showed a positive Kahn reaction, but only 4 showed a positive Ide. No case exhibited a positive Ide and a negative Kahn reaction. One case was possibly syphilitic for, after having two negative Kahns, he suddenly became strongly positive fifty-eight days after he had shown malignant tertian rings in the blood; at the same time he developed a profuse rash of a syphilitic type.

If this case be eliminated, 22 out of 79 patients, or 27·0 per cent, at some period showed a positive Kahn reaction, a far higher percentage than that found in the British military population in this area.

<sup>1</sup> Owing to pressure on space detailed tables of results have had to be omitted from this article.—ED.

In the majority of cases the positive Kahn was only temporary but, in some, the positive reaction was still present forty-two days after the first demonstration of parasites in the peripheral blood.

#### DISCUSSION.

It is obvious that in assessing the value of a positive Kahn reaction in British soldiers it is essential to take into account their malarial history. The Ide test in the present series gave considerably fewer "false positives" when carried out at the same time as the Kahn test. Recently also Kahn (1940) has shown that true syphilitic sera show more marked precipitation at 37° C. than at 1° C. while non-syphilitic sera giving positive reactions show, under the same conditions, more marked precipitation at 1° C. than at 37° C. (general biologic or non-syphilitic type of reaction). This is known as the Kahn verification test. Kahn, McDermott and Marcus (1941), Jacobsthal (1941) and DeGroat (1943) have all shown that this test is of value in differentiating false positives from those actually due to syphilis.

#### CONCLUSIONS.

An examination by the Kahn test of the sera of 80 British soldiers serving in a hyper-endemic malaria zone and suffering from malignant tertian malaria showed that 23 of them gave at some period a positive reaction.

Only one of the patients showed any evidence of syphilis. The Ide test was positive in 4 cases, all of whom had positive Kahn reactions.

Attention is called to a modification of the Kahn test by means of which it is claimed that false may be differentiated from true positive reaction.

Our thanks are due to Brigadier J. B. A. Wigmore, D.D.M.S., West African Force, for permission to forward these results.

#### REFERENCES.

- DEGROAT, A. (1943). *J. lab. & clin. Med.*, **28**, 882.  
FELLOWS, F. S., and PERRY, W. B. (1941). *Ven. Dis. Inform.*, **22**, 237.  
HARMSSEN, H., and HAUER, A. (1943). *Dtsch. med. Wochr.*, **69**, 147.  
JACOBSTHAL, E. (1941). *Bol. Sanit. de Guatemala*, **12**, 190.  
KAHN, R. L. (1940). *Arch. Dermat. & Syph.*, **41**, 817.  
KAHN, R. L., McDERMOTT, E. B., and MARCUS, S. (1941). *Amer. J. Syph. Gonorr. & Ven. Dis.*, **25**, 151.  
KAPLAN, B. I., and BRIGHTMAN, I. J. (1943). *Amer. J. publ. Hlth.*, **33**, 1073.  
KITCHEN, S. F., WEBB, E. L., and KUPPER, W. H. (1939). *J. Amer. med. Ass.*, **112**, 1443.

## *Clinical and Other Notes.*

### THE ANNULAR FORMS OF *SPIRONEMA PERSICA*.

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AND

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*(From the Laboratory of a General Hospital, M.E.F.)*

[Received March 23, 1944.]

THE occurrence of relapsing fever among troops in Cyprus has established that tick-borne relapsing fever is endemic on the island [1]. The spironema was found in the blood of troops usually about nine days after bivouacking in caves infested by the tick *Ornithodoros tholozani*. Doubtless cases had previously occurred among the civil population on the island as it was generally believed in rural areas that bouts of fever followed the bites of ticks.<sup>1</sup> The causative organism of this Cyprian relapsing fever has been conveyed to guinea-pigs [2] and is thus almost certainly *Spironema persica* which is also responsible for the tick-borne relapsing fever of other Levantine countries.

The morphology of the organism was studied [2] by the method of suspending heavily infected guinea-pig blood in human citrated serum. By this means the guinea-pig corpuscles are agglutinated and the spironema is observed by dark-field illumination free in clear serum apart from the agglutinated corpuscles. In serum preparations ringed with vaseline the spironema remains alive and actively motile for more than two days. The spironema is a regularly coiled spirochæte and possesses from three to eleven coils. Under dark-field illumination it has a dark central spiral core bounded by brightly illuminated walls. Fine spiral filaments, one at either end of the organism, can often be seen. Sometimes two organisms are joined end to end by a fine single spiral filament. Annular forms, in which the ends of the organism are joined together by a fine filament to form a continuous circle, were also observed in these preparations of the Cyprian spironema. The annular forms are highly motile rotating to and fro for many hours. The present communication describes the structure of the annular forms in greater detail.

Obermeier described coiled and circular forms of *Spironema recurrents* when he first discovered the causal organism of relapsing fever in the Berlin epidemic of 1867. Little attention has, however, since been given to the nature of these coiled and ring forms, though many observers must have encountered coiled forms in routine clinical examination of fixed films from cases of relapsing fever and Noguchi has described degenerate spherical forms of the organism in old cultures.

The annular forms of *Spironema persica*, when examined under dark-field illumination with the technique described above, are seen to consist of a motile free inner spironema revolving inside a tubular ectoplasmic sheath. It has long been suggested that the *Spirochaetales* possess an ectoplasmic covering and that the spiral filaments attached at either end of the ordinary free form are really prolongations of the ectoplasmic envelope. The formation of these annular forms permits this ectoplasmic covering clearly to be seen apart from the contained endoplasm. On the adoption of ring formation the outer circumference of the

<sup>1</sup>We are indebted to Mr. Theophilus Mogabgab, Curator of Antiquities, Famagusta, for this information.

sheath is stretched into a circular shape, while the inner side of the envelope is thrown into loose folds, both being clearly visible apart from the inner motile endoplasm. The outer circumference of the ectoplasmic (or capsular) sheath is seen as a fine brightly-illuminated filamentous covering encompassing the inner snake-like spironema and is most readily visible opposite the troughs in the wave structure of the inner spironema. Here the sheath is stretched across between the crests in the sinuities and is momentarily not in contact with the inner motile endoplasm. Over the actual crests of the wave the superficial envelope is not visible as it is here in contact with the inner motile substance. This part of the envelope (over the actual crests of the wave) soon, in its turn, becomes visible as the crests are replaced by troughs. The inner circumference of the ectoplasmic covering of the annular forms is also seen as a fine filamentous structure on careful scrutiny. It is, however, much looser than the outer ectoplasm and is readily thrown into folds to which wave motion may be imparted by the contained motile endoplasm. Between the two ends of the spiral endoplasm the ectoplasm is seen as a single bright thread preserving the continuity of the circle. The ectoplasmic sheath is extremely fine and careful focusing and light adjustment are necessary to delineate both its inner and outer circumference. For this purpose an iris diaphragm in the body of the 1/12 objective is almost an essential so that the diameter of the stop can be varied at will.

#### ANNULAR FORM OF *Spironema persica*.

The mode of formation of the annular forms remains a matter of conjecture. Annular forms have, however, been observed being produced by the entanglement of the opposite ends of the same free spironema. The ectoplasm of the terminal filaments presumably becomes continuous and an ectoplasmic tubular sheath results in which the imprisoned endoplasm continues to rotate. The outer circumference of the tubular sheath is stretched out of its spiral shape and is thus in part separated from the endoplasm. The inner circumference is, on the other hand, loose and is readily thrown into folds. The adoption of the annular structure has enabled the previously tightly attached ectoplasmic envelope to be seen in part clearly separated from the contained endoplasm. In one instance at least two short 4-coiled spironemata were observed inside one and the same capsular sheath, and also many short 3-and 4-coiled organisms have been seen in the vicinity of groups of the annular forms. These facts raise the possibility that the sheaths of the annular forms can be discarded. Discard of the original ectoplasmic covering of the spironema might well account for the well-known change in serological character of the organism as isolated from successive relapses of the disease, loss of original ectoplasm being associated with change in antigenic structure.

#### SUMMARY.

The annular forms of *Spironema persica* consist of motile endoplasm rotating inside an ectoplasmic envelope. The adoption of the annular structure allows the ectoplasm covering of the spironema clearly to be demarcated from its endoplasmic contents.

We wish to thank Colonel J. S. K. Boyd for valuable advice and for his kind interest in this work.

#### REFERENCES.

- [1] WOOD, R. C., and DIXON, K. C. (in the press).
- [2] DIXON, K. C. (1943). *J. Royal Army Medical Corps*.

## REPORT ON REACTIONS TO ANTI-PLAGUE SERUM.

BY MAJOR J. MACKAY-DICK,

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[Received April 3, 1944.]

SEVEN British officers and four British other ranks, all close contacts of plague, all received 3 c.c. of plague vaccine and 5 c.c. of anti-plague serum with the exception of one British officer who only received serum as he had already been protected against plague. In addition, four Indian officers, some V.C.O.s and numerous I.O.R.s received the same vaccine and serum and from the same small amount which had been supplied.

The severity of the delayed reactions amongst the British, essentially in the form of serum sickness, commencing almost to the minute at the beginning of the sixth day following the injections, are considered worthy of record.

*Serum used.*—From Serum Department, Lister Institute. Date of preparation: 1941. To be used prior to July, 1943. Actually used January, 1944, and considered safe to use. Vaccine used: Haffkine's.

*The Reactions are Divided into:—*

*IMMEDIATE, i.e. onset within twenty-four hours.*

*Local (Vaccine):* Usual signs of a local reaction with associated adenitis of neighbouring lymph glands.

*Serum Reaction:* (a) Mild.—Urticaria of trunk and extremities. (b) Severe.—Same as (a) plus severe swelling of face, lips, eyelids, tongue and hoarse voice.

*DELAYED, i.e. commencing at the beginning of the 6th day.* (i) *Mild:* Febrile reaction, malaise, local reaction. Associated painful, tender, discrete adenitis of neighbouring lymph glands. (ii) *Moderate:* Severe nausea, headache; fainted twice. (iii) *Moderately Severe:* Discrete, painful, tender adenitis (cervical, axillary and inguinal) with local reaction and evanescent generalized urticaria with final severe angio-neurotic oedema. Febrile. (iv) *Severe:* Multiple reactions, i.e. fever, headache, malaise, evanescent urticaria with angio-neurotic oedema. Difficulty in micturition in one case due to swelling of the penis. Discrete, painful, tender adenitis (cervical, axillary and inguinal); severe muscle pains; severe joint pains with crippling. Joints affected: Temporomandibular, shoulders, elbows, wrists, hands, hips, knees, ankles and feet. Large effusions into both knees in one case. Subsequent marked weakness, loss of weight and relatively slow convalescence.

Two cases had both immediate reactions (serum) and delayed reactions.

Two had immediate local (vaccine) reaction and delayed reaction.

## BRITISH CASES.

No reactions	..	..	..	1	..	..	9.09 per cent
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*Immediate.*

Local (vaccine) ..	..	..	3	..	..	27.2 per cent
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Serum reaction (a) mild ..	..	2	..	..	18.1 per cent
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(b) severe ..	..	1	..	..	9.09 per cent
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(Severe Case Delirious, Collapsed and Admitted Hospital.)

*Delayed.*

Mild ..	..	..	1	..	..	9.09 per cent
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Moderate ..	..	..	1	..	..	9.09 per cent
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Moderately severe ..	..	..	1	..	..	9.09 per cent
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Severe ..	..	..	5	..	..	45.45 per cent
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All severe cases had to be admitted to hospital. All were incapacitated and were lying cases.

Cases exhibiting SEVERE signs and symptoms occurring at  
the beginning of the 6th day almost to the minute. . . . 63.63 per cent  
Cases exhibiting serum sickness . . . . . 73 per cent

Of the eleven members of the British Service, one was a Palestinian (moderate reaction delayed) and one was an Egyptian (mild reaction delayed). The remaining cases were born and bred in the United Kingdom and all bear names peculiar to the Celtic races of the British Isles and Eire. Amongst the severe delayed reactions were three fair-haired, blue-eyed Scots, one Welshman and one Englishman with an Irish name.

Out of 4 Indian officers who had both injections one had a severe delayed reaction (serum sickness) just as the severe British cases, and he had to be admitted to hospital. The three other officers had vague aches and general malaise.

There were no reactions complained of, or especially noted, amongst the V.C.O.s or amongst the numerous I.O.R.s who received both vaccine and serum.

*Routine Treatment consisted of:* Judicious exhibition of adrenalin hydrochloride (1-1,000) hypodermically as indicated; Ephedrine hydrochloride gr.  $\frac{1}{2}$  t.d.s. p.c. *per oram*. Large doses of calcium; massive ascorbic acid therapy; fluids *ad lib.* and fruit drinks; lotio borocalamine locally as necessary; luminal if required; alkaline drinks; painful joints immobilized in optimum position; heat; early movements of joints which quickly returned to normal.

From my experience, except for a very small number of cases, the reactions following anti-plague vaccine are local and occur within twenty-four hours of injection. Some of the reactions are delayed though mild.

Severe reactions usually appear within twenty-four hours and are accompanied by fever, generalized painful tender and discrete enlargement of lymph glands with occasional tender enlargements of the spleen, as well as a marked local reaction. Such patients feel very ill and prostrated and have a high fever and severe headache for twenty-four to forty-eight hours. These remarks are confined to reactions following vaccine.

#### CONCLUSIONS.

There is no question of a bad batch of serum being responsible for the high incidence of reactions occurring amongst individuals from the United Kingdom because the same small supply of serum was used for both British and Indians on the same days.

The difference in the reactions in the dark-skinned and fair-skinned races is of interest. The high incidence of reactions amongst the British of Celtic stock seems worthy of mention.

The delayed reactions, i.e. those occurring from the sixth day onwards following serum and vaccine administration, are considered to be manifestations of serum sickness.

The incidence of serum sickness amongst the British was very high.

In close contacts of plague who are doing important work replacements for one-third at least should be available from the sixth day following the administration of 5 c.c. of anti-plague serum if the above experience is to be taken as a guide.

It may be that the delayed reactions were intensified because of the joint administration of anti-plague vaccine and of anti-plague serum but it must be pointed out that one case, already protected against plague, received only the anti-plague serum and the delayed reactions in this case were extremely severe.

If any of the cases with severe reactions had been in occupations involving severe physical strain they would have all been off duty for at least fourteen days for, on return to their duties, they were all *very feeble physically* and had visibly lost weight.

On the whole, the younger the individuals receiving serum, the greater the reactions and *vice versa*.

This report has been much shortened owing to scarcity of paper available for Medical Journals.

*Acknowledgments.*—Major-General W. C. Hartgill, M.C., O.B.E., D.M.S., for permission to forward these notes. Brigadier Sidney Smith, K.H.P., Consultant Physician in Tropical Medicine, for helpful criticism and advice. Colonel C. M. Forster, Commanding General Hospital, for permission to forward these notes for publication. 7356404 Q.M.S. H. J. Wilding, for his patience and co-operation in typing these notes for me.

A CASE OF INFECTION OF A EUROPEAN WITH  
*STRONGYLOIDES STERCORALIS*.BY MAJOR J. C. G. WHITELOW, M.A., M.B., B.CHIR.,  
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AND

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[Received December 1, 1944.]

THOUGH common in Africans, *Strongyloides stercoralis* seems uncommon enough in the European to warrant the publication of a case of diarrhoea caused by this worm.

Routine examination of the stools of African food-handlers, civilian and military, shows the frequency of this helminth to be about 11 per cent. Frequently these stools show no abnormality attributable to the worm, but diarrhoea stools occur more often in those cases in which it is seen than in those in which it is absent. (A ratio of 5 : 4 in a series of 300.)

In striking contrast to its frequent occurrence in Africans is the rarity with which this worm occurs in Europeans. In a series of 5,000 stools contributed by 1,952 patients, this case is the only instance in which the worm was found.

*Case History*.—J. M., aged 29. Service 13 years.

The patient had spent an aggregate of almost two years in Sierra Leone. No previous illness other than a doubtful glandular fever in April, 1943, and malaria in 1936. Admitted to hospital on August 3, 1943.

He was well until the afternoon of the day prior to admission, when he complained of slight diarrhoea—bowels open four times, the stools being loose and "slimy" but without visible blood. On admission, temperature 99, pulse 80. General condition, good. Tongue coated and moist. Liver and spleen not palpable. Some tenderness in the right iliac fossa but no abnormality found on palpation. No tenderness in the left iliac fossa. Heart, lungs and C.N.S.—N.A.D.

*Stool*: A hard brown motion with small amounts of mucus.

Microscopically no blood or pus cells, amœbæ, cysts, ova or flagellates seen. Embryos of *Strongyloides stercoralis* present in considerable numbers.

Aug. 4, 1943: Felt well, bowels open once in the night, but not during the day.

Aug. 5, 1943: Treatment begun with a course of gentian violet, gr. 2½, t.d.s., for ten days.

Progress continued to be satisfactory and the bowel actions reverted to the patient's customary twice daily. Nothing abnormal was found in stools examined on August 11 and 13. The patient was discharged fit and free from all symptoms on August 14, 1943. Further specimens examined on August 21 and September 1 showed no embryos.

The source of the infection could not be traced. All food was obtained from Army supplies, the Mess servants and their stools being examined monthly. It was the custom to exclude carriers of *Strongyloides stercoralis* from Messes, although it is not infectious when first passed. No other cases of gastro-intestinal upset were reported in that Mess.

The patient worked in a food-store, and his stools were examined each month, the last being done on July 8, 1943, and found free from any abnormality. The patient had access to a town, and it is possible he acquired his infection there.

*Summary*.—A case of infection of a European with *Strongyloides stercoralis* is described.

We wish to thank Lieut.-Col. J. A. W. Segerdal, R.A.M.C., Officer Commanding the Hospital, for permission to forward this case for publication.



## THE CONVALESCENT DEPOT OVERSEAS.

BY MAJOR G. D. KERSLEY, M.D., F.R.C.P.,

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[Received August 1, 1944.]

HAVING spent over two years in Convalescent Depots in this country and nearly as long visiting those in the Middle East, Persia and Iraq, it is interesting to compare the differences in their working. My remarks will be confined to the *modus operandi* of five 2,000-bedded British Depots though there were at one time in the Middle East also Indian, New Zealand, South African and Australian Depots in addition to smaller British units at outposts such as Malta and Cyprus.

The work of overseas Convalescent Depots falls easily into two categories—forward and base.

These latter base units, which will be discussed first, were situated in widely different localities, some in desert surroundings and some, for instance in Palestine, under conditions more comparable with those at home. A few were entirely huddled but the majority had tents dug in on concrete bases with sheds or built-up huts for annexes, kitchens, dining halls, N.A.A.F.I. and often a cinema. Bathing facilities were always available either in the sea or, in one case, in the Suez Canal.

Apart from climatic considerations—as a rule little work was desirable in the heat of the afternoon—they had to cope with two problems not met at home—they had to take cases at an earlier stage of treatment, owing to the absence of Red Cross Homes, and the lack of outside amenities made a greater need for the organization of entertainment and occupation within the unit.

As a result of the absence of B.R.C.S. Homes, a number of cases arrived at the Depots before they were fit for any physical training; many were still in plasters. Most of these latter cases were looked after by a Specialist, or graded Specialist, in Physical Medicine who was held on the Depot Establishment. The procedure was that all cases were seen by the O.C. Medical Division and those—perhaps 200 out of 2,000—that required special care, physiotherapy and remedial exercises were referred to the Physical Medicine Specialist who was responsible for them till they reached the final hardening grade, when they were returned to the O.C. Division for discharge. Repairs and minor alterations to plasters were carried out by the Specialist in Physical Medicine in the Depot while others requiring checking by X-ray were returned to hospital. Arrangements were made for an Orthopædic Specialist from the nearest centre to visit the Depot every week or so to see those cases about which a second opinion was required.

An officer of the Army Catering Corps, a Sergeant of the Educational Corps and a chiropodist were all found to be very useful additions to the staff and more than justified their appointments.

Grading was very similar to that in this country, usually four grades proving sufficient. Grade IV, in which no P.T. or fatigues were carried out, was missed by some of the fitter patients. A man in Grade III did light P.T. and light fatigues, together with remedial exercises and physiotherapy if indicated by his condition. Grade II did heavier P.T. and fatigues and those of lower medical category were discharged from this grade. Grade I was for hardening and the men did some marching and an easy run and obstacle course.

Documentation was simplified as much as possible. Each man arrived only with a discharge form (A.F. ME 32) and no I 1220. Only two other forms were then completed, A.F. ME 17A, on one side of which were the particulars of his age, address, unit, trade, etc., and on the reverse were his medical notes. This form was filed at the Divisional Office. A.F. ME 17B was a small card which the man retained himself and on which were entered his grade, any special treatment or any permission granted for him to have his bed down, be excused agility work, etc.

The establishment of A.P.T.C. staff was raised to 12 and deficiencies were made up by training Assistant P.T. instructors, selected from among the patients and held by the Depot by permission of Second Echelon. The P.T. staff supervised all remedial cases, P.T., games, bathing and the hardening programme. Three principles in this connexion are worth stressing; the lightest P.T. must be very easy—there is the greatest difference between doing nothing and even the easiest exercise; games must be for all, not just for the few athletes; the obstacle course is not an assault course—jumps from high ramps causing frequent sprains are taboo. The Physiotherapy Department varied in activity according to the type of work but often four or five masseurs were fully employed.

Occupational Therapy and Diversional Occupation became an important service. True therapy was mainly used for the hand cases but the value of the workshops in employing the patients both on and off duty cannot be exaggerated. Carpentry, tinsmithing, engineering, leather work and painting and drawing were most popular. The shops assisted greatly both in raising morale and in making useful articles to brighten and improve the Depot.

The feeding was as a rule excellent and a small additional ration was obtainable. The family system of messing did much to reduce the length of time spent in queues and in ensuring that the food reached the men hot.

With regard to entertainments Depot Concerts were a great feature. Once a week an informal talent spotting contest was held in the N.A.A.F.I. when any volunteer performer received cigarettes or a bottle of beer and from these volunteers the "stars" for the weekly concert were selected. The spotting contest was quite informal and took place while the remainder of the room was full of men playing chess, darts, etc. The Depot band was of course an important feature both at the concert and playing in the break or for massed P.T. Its nucleus of four was augmented by convalescents whose selection was assisted by a combined Labour Exchange and Information Centre. Here was kept a register of men's qualifications, trades and hobbies, a register accessible to those arranging entertainments, sport and Depot maintenance. Here there was also a wall newspaper and outside was erected a large notice board giving a list and time of all amenities and sport. Brains Trusts and Spelling Bees were also organized but the most popular of all departments were the library and cinema.

The forward Convalescent Depots had to improvise, be ready to expand and to turn their hands to any type of work that the situation might require. Two near Tripoli expanded to take 6,000 cases at one time during the Tunisian Campaign and repeated the expansion during the assault on Sicily.

One Depot was in a large Italian workshop, the sheds lending themselves well to improvisation of kitchens, barracks, workshops and gymnasias. The other was entirely tented. This brought out the fact that the tentage allowed is quite inadequate unless, as is usually the case, some buildings can also be utilized. The difficulty here was solved by borrowing from a neighbouring hospital that was housed in buildings.

In the Tunisian Campaign at one time 60 per cent of the cases in these Depots were minor battle casualties who had only been in hospital a day or so and who required daily minor dressings. Some medical staff had to be loaned to assist in coping with the situation. Among the remaining 40 per cent was a number of battle weary, who had temporarily cracked under the strain. They had had five days of rest and "dope" in hospital and then had two or three weeks at the Depot, during which time they were kept fully occupied with moderate physical work. A very large percentage of both these minor injuries and borderline psychiatric casualties returned to the front line in less than a month. Even if evacuation to the base in the Delta had been possible they would have been lost to their units for 3-6 months instead of one.

Again in the Sicily Campaign these Depots expanded to 150 per cent capacity to take malaria cases. They received these cases as soon as their fever was controlled by quinine and both the mepacrin and plasmoquine treatments were carried out while in the Depots.

The only type of case not catered for at an overseas Convalescent Depot is the "gastric" as dietetic facilities cannot be provided. All other needs can be met, most Depots running

a Camp Reception Station of twenty to sixty beds as part of the team. To cope with all the demands made, however, taxes the ingenuity of the staff owing to the small War Establishment, which leaves them particularly short of storemen and clerks, a Warrant Officer for the Orderly Room and transport. The British Red Cross helped greatly in the latter respect by providing a bus for recreational purposes.

Latterly no sick-leave was granted to officers in the Middle East and Convalescent Sections for 120 officers were attached to certain 2,000-bedded Depots. They had their own Establishment which included another medical officer. The experiment worked well and, much to our surprise, they became quite popular. Officers fed with the staff and every effort was made to Mess them as well as was physically possible. They were occupied in the camp till lunch time with P.T., bathing, riding, games and craft work, but they could go where they liked during the latter part of the day. They usually paid a few visits to the nearest town, but many spent the bulk of their time interesting themselves in Depot activities.

A Convalescent Depot is a very difficult unit to run happily and efficiently yet, when so run, it is of all medical units the most important from the point of view of manpower. Conversely, a poor Depot is not only a squanderer of manpower but is a menace to morale.

### MENINGOCOCCAL SEPTICÆMIA ASSOCIATED WITH JAUNDICE.

BY CAPTAIN T. J. REICH, M.D.,

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[Received June 9, 1944]

SINCE the rarity of association of these two conditions is likely to lead to the question being raised of their being entirely due to the meningococcus or of the septicæmia occurring as a separate entity in a patient with an infective hepatitis already developing on its own, brief notes of another example of this nature are submitted for comparison with those already published in the *B.M.J.* of 4.3.44 [1].

A. P. A. became ill on 23.4.44 with headache, malaise, nausea and vomiting; there was no cough, bowels were regular, stools of normal colour and urine was slightly dark. There was no fever and apart from the features mentioned clinical examination was negative until 28.4.44 when icterus of skin and conjunctivæ was observed and he was admitted to hospital on 29.4.44. On admission he proved, for the first time, to have a temperature of 102° and a pulse of 90 per minute; he had moderate jaundice and the only other feature was a petechial eruption chiefly seen on his legs but also on his chest and fore-arms. He still had headache and anorexia but did not look very ill. Apart from these physical signs and symptoms, together with the presence of albumin, bile salts and bile pigment in his urine, examination yielded nothing.

His blood count was Hb. 104 per cent (Haldane), R.B.C. 5,150,000, W.B.C. 13,800. Polymorphs 73 per cent, lymphocytes 20 per cent, monocytes 7 per cent.

His temperature fell to normal that night and on 30.4.44 rose to 101; there was no change in his condition. Blood culture was undertaken. On 1.5.44 a scanty growth of Gram-negative diplococci was observed and at 14.00 hours sulphathiazole treatment was commenced, 2 grams followed by 1 gram four-hourly. His temperature had fallen to normal again by then and remained normal subsequently.

His condition, never regarded as serious, rapidly improved, the petechiæ fading and shortly afterwards the jaundice. One or two of the petechiæ on the legs developed small vesicles in their centres but culture of the contained fluid (before therapy had been instituted) was sterile. On 5.5.44, Major Riddell, Pathologist, reported that meningococcus was confirmed on culture and biochemical reaction; confirmed also by agglutination test—Griffiths type II. A total of 20 grams of sulphathiazole was given over a period of four and a half days. He is now (15.5.44) convalescent and up and about but rather washed out; his hæmoglobin fell to 80 per cent during his illness. At no stage was there any evidence of meningeal reaction.

It is impossible to say if this man suffered from meningococcal septicæmia causing jaundice or from meningococcal septicæmia accompanied by infective hepatitis; the mode of onset and appearance of jaundice on the fifth day, and before any manifestation of septicæmia was observed, suggested the latter. There are a sufficient number of cases of hepatitis in the district at the moment to justify postulating such a course of events.

I am indebted to Colonel F. D. Annesley, M.C., for permission to forward these records.

## REFERENCE.

- [1] CRAWFORD, C. (1944). *B.M.J.*, p. 325.

## NOTES ON AN UNUSUAL BATHING FATALITY.

By MAJOR I. H. LLOYD-WILLIAMS, M.C., T.D., M.B.,

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[Received August 28, 1944.]

The subject of this article was a healthy man aged 31. On the morning of the accident he had gone to the Public Baths and at the time of the accident was swimming at the deep end. A youth of about 18, estimated weight of about nine stone, did a backward somersault from the diving step, the height from the water not being known. He struck the deceased with his back in the region of the neck (? upper part of the chest). The man was seen to float under the water and had to be fetched up from the bottom.

On being brought out, after a submersion estimated at 3 to 4 minutes, artificial respiration was carried out. He was sick, coughed and spat a pinky fluid. He was taken to lie down in a side room and was unable to say what had happened to him. On getting up unassisted he was sick and was helped to a truck which brought him to a Reception Station about eight miles away. He was sick again on the journey.

*Condition on Admission.*—He was admitted at 09.30 hours and was seen by me about fifteen minutes later. He was obviously an ill man with a soft pulse of 70 and no obvious external injury. He was sick, the vomit containing brown-coloured material. Bouts of coughing with frothy reddish sputum occurred. The systolic blood-pressure at this stage was 110 mm. Owing to his condition an exhaustive examination was not deemed advisable but such auscultation as could be done did not disclose any adventitious sounds.

*Progress and Treatment.*—Restlessness became more marked and the pulse-rate increased to 150; respiration was 30 at the start and increased to 50. Cyanosis developed and increased in depth. The surface of the body became colder and epistaxis occurred later.

Treatment consisted of rest and warmth, at first by hot-water bottles and later by electric cradle. When restlessness became too marked, morphia gr.  $\frac{1}{4}$  was administered at 10.15 hours. Oxygen was given through a funnel as he was too restless to have a mask fitted.

Death took place at about 15.30 hours.

*Post-mortem examination.*—No external marks of violence were observed when this was done about twenty-four hours later. Post-mortem staining was present.

On opening the chest the lungs were voluminous with dark purplish patches on the surface and emphysematous bullæ under the pleura. There were no pleural adhesions and there was excess of watery fluid in the pleural cavities. On cutting into the lungs frothy blood-stained fluid exuded and there were small dark areas of hæmorrhage into the lung substance. The heart muscle was normal. The left ventricle was empty but the right was full of soft dark clot. The veins generally were full of dark fluid blood. There was excessive fluid in the pericardial sac. The spleen and kidneys were rather congested, the liver not obviously so.

On opening the skull, no evidence of fracture of the base was observed. The veins of the cerebral surface were congested.

## SUMMARY.

An account is given of a man who was dived on by another swimmer. As a result of the impact of the diver, he was squeezed between this force and the water.

The symptoms in life were those of an acute congestion of the lungs with hæmorrhagic effusion.

The post-mortem findings were apparently similar to those found in blast injuries.

It would appear there must have been sufficient compression of the chest at the time of impact to produce a contusion of the lungs.

My thanks are due to Major M. White, M.C., R.A.M.C., O.C. Reception Station, for permission to forward these notes.

#### REFERENCES.

- A.M.D. Bulletin*, No. 22, April, 1943.  
*Field Surgery Pocket Book*, 1944.

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### Current Literature.

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DOWLING, H. F., HARTMAN, C. R., FELDMAN, H. A. and JENKINS, F. A. **The Comparative Value of High and Low Doses of Sulfadiazine in the Treatment of Pneumococcic Pneumonia.** *Amer. J. M. Sci.* 1943, Feb., v. 205, No. 2, 197-203. [11 refs.]

Eighty-one unselected adults with typed pneumococcal pneumonia were treated with an initial dose of 2 grammes of sulphadiazine, followed by 0.5 grammes every four hours until recovery was certain or death ensued. The results obtained were compared with those following the administration to 79 patients of an initial dose of 6 grammes followed by 1 gramme every four hours. The groups were comparable in respect of age groupings, but the percentage of bacteræmic cases was 16.5 in the high dose group compared with 11.1 in the lower dose group. There was no significant difference in fatality in the two groups (6.2 and 10.1 per cent with the low dosage and high dosage, respectively), nor in the incidence of serious complications. The higher dosed cases, however, were slightly more often followed by rapid recovery, and they showed less likelihood of relapse, spread to another lobe, or of delayed resolution. Toxic reactions were infrequent in both groups, and no more numerous in the high-dosage than in the low-dosage group. The fact that decidedly smaller doses of the drug than are usually recommended can effectively be used is considered important, since, in the present emergency, limitation of supply of the sulphonamides may occur at times.

A. JOE.

*Reprinted from "Bulletin of Hygiene," Vol. 18, No. 8, 1943.*

CHARGIN, L., SOBEL, N. and GOLDSTEIN, H. **Erythema Infectiosum. Report of an Extensive Epidemic.** *Arch. Dermat. & Syph.* 1943, Apr., v. 47, No. 4, 467-77, 1 coloured pl. [14 refs.]

The diagnosis of erythema infectiosum is not very often made. An outbreak allowing the study of many cases is therefore of importance. This paper deals with an orphanage in New York City, where 80 out of the 137 children were attacked between November 4, 1941, and April 11, 1942. There were 80 primary attacks and 90 relapses, so that in all 170 attacks were observed. "Briefly, the sequence of events is as follows: Almost always the exanthem is the first symptom; rarely mild prodromal symptoms appear in the form of malaise, sore throat, coryza and fever. Nearly always the rash first appears on one or both cheeks in the form of a bright red area; the appearance is as though the cheeks had been slapped. There is slight œdema, and the cutaneous surface is smooth. The erythema stops abruptly at the nasolabial fold and the lower orbital border; occasionally it crosses the base of the nose, producing a butterfly configuration like that seen in lupus erythematosus.

The cartilaginous portion of the nose and the circumoral area are always strikingly pale, the picture simulating in this respect that of scarlet fever. The posterior border of the erythema shades off gradually. In the mild attacks, the exanthem is superficial and fades rapidly; in the more severe, it acquires a deep cyanotic hue and regresses more slowly, feeling hot to the touch. The chin is seldom affected; the forehead, more often. The rash on the face usually lasts one to four days, although occasionally for several weeks. There is no enanthem, except sometimes mild redness of the throat and tongue or red macules on the hard or soft palate. At times simultaneously, but usually within twenty-four to thirty-six hours after the onset on the face, an eruption appears on the extremities, especially the arms, but only in a portion of the cases. The extensor surfaces are commonly attacked. The palms and soles remain free. The gluteal region is frequently affected, while on the trunk, which often remains free, an erythema may appear resembling the rash of rubella. On the extremities, the eruption appears as discrete, minute, bright red macules, which gradually enlarge and may coalesce. Often the lesions become papular. Thus the rash may be morbilliform or scarlatiniform. As time progresses, the central portions of some lesions assume a violet colour or fade completely; thus ringlike or garland-like lesions are formed, as in erythema annulare or erythema gyratum. Occasionally by confluence of lesions a maplike appearance results. On the extremities the eruption usually remains from six to fourteen days, exceptionally up to twenty days; it may clear for hours or days only to reappear, either spontaneously or after slight local irritation. A peculiar cyanotic colouring, like cutis marmorata may remain after the rash disappears."

Girls proved to be most severely affected, whilst the younger boys suffered only mild attacks and escaped all relapses. The eruption was in fact limited to the face in 64·7 per cent of the children. Extensive laboratory and epidemiologic studies failed to throw any light on the causation and it is remarkable that these children attended an independent public school where no other case of infection developed among the other "outside" children. Certainly there is no evidence that carriers exist. The incubation period varied from one to twelve days. There are never any complications.

SYDNEY THOMSON.

*Reprinted from "Bulletin of Hygiene," Vol. 18, No. 8, 1943.*

AMES, W. R. and ROBINS, M. **Age and Sex as Factors in the Development of the Typhoid Carrier State, and a Method for Estimating Carrier Prevalence.** *Amer. J. Pub. Health.* 1943, Mar., v. 33, No. 3, 221-30, 1 fig. [15 refs.]

Early in the present century Klinger noted the difference in age distribution of temporary and chronic typhoid carriers, the curve of temporary carriers running parallel with that of cases by age, most being children and young persons, whereas chronic carriers were commonest among middle-aged adults and rare in children. The probability of becoming a carrier increased rapidly with age, being about ten times as high at 50 years as at 20 years. Ledingham and Arkwright, among others, also noted the preponderance of adults as chronic carriers and that the majority were females. Möller in 1926 found 64 chronic carriers among 7,125 recovered cases and of them 45 were adult females, 16 adult males and 3 children.

The authors analysed some New York State returns for the years 1930-39, and the following table shows the numbers of cases and carriers:—

TYPHOID CASES AND RESULTING CHRONIC CARRIERS BY AGE, FOR THE YEARS 1930-39  
(NEW YORK STATE, EXCLUSIVE OF NEW YORK CITY AND STATE INSTITUTIONS).

Age at time of attack	Number		Per cent cases becoming carriers
	Cases	Carriers	
Under 10 .. .. .	628	2	0·3
10-19 .. .. .	902	3	0·3
20-29 .. .. .	579	12	2·1
30-39 .. .. .	409	18	4·4
40-49 .. .. .	295	26	8·8
50-59 .. .. .	188	19	10·1
60 and over .. .. .	129	10	7·8
All ages .. .. .	3,130	90	2·9

Nearly half (1,530 out of 3,130) of the patients were under 20 years of age, but only 5 out of 90 carriers were of this age period. Female cases totalled 1,387, males 1,743 (44·3

and 55.7 per cent respectively) but carriers were 53 and 37 (or 3.8 and 2.1 per cent of cases). In the 40-49 group 20 out of 122 female patients became carriers (16.4 per cent), but only 6 of 173 males (3.5 per cent).

As regards convalescent carriers sex differences were not statistically significant, but the age factor was. At ages 30 and over more than three-fourths were passing the bacteria in their stools in the second week of illness; in the nineteenth week the percentage had fallen to 7.7. Under 30 years, two-thirds were excreting the bacteria in the second week, but by the sixteenth week only 0.8 per cent. An estimation of the number of carriers under 80 years of age in the State (excluding New York City and the Institutions) on January 1, 1940, gave a total of 2,490, or a prevalence of 42 carriers per 100,000 persons under that age; the rate among the 70-79 year group was 340 per 100,000. The rate among children under 10 years of age was less than 1 per 100,000.

In their conclusions the authors remark that carriers among typhoid patients over 30 years of age were nine times as numerous as among younger patients and that approximately 16 per cent of females developing typhoid fever in their fifth decade become chronic carriers.

H. HAROLD SCOTT.

*Reprinted from "Bulletin of Hygiene," Vol. 18, No. 8, 1943.*

**RÜTISBER. Observations on the pathogenesis and aetiology of nephritis on the Eastern front during the winter of 1941 to 1942.** *M. m. W.*, 2, 863, 1942. In *Klin. Woch.*, 22, 606, 18.19.1943.

Observations on 160 cases of war nephritis showed there was a prodromal stage of five to eight days but this was frequently extended to two or three weeks. The first symptom is lassitude, easy fatiguability, often with influenzal-like short periods of fever. Headache and respiratory difficulty occur early, accompanied by a feeling of thirst and urgency of micturition. With the onset of the disease, there is a hydrops, especially in the face and thorax. There is a slight papilloedema and a hint of slight congestion. A severe degree of congestive bronchitis is frequently associated with pleural exudate and cardiac asthma may be present. There is left-sided cardiac-hypertrophy and often additional involvement of the right side but, on the other hand, there is no secondary dilatation. The first sound is strongly emphasized and bradycardia, 30 to 50 per minute, is striking. This corresponds to the left sided hypertrophy with slight involvement of the right heart which can be demonstrated by X-rays. The frequency occurring "würmförmigen" contractions are explained as due to oedema of the heart muscle itself and a slight degree of hydropericardium. Indication of pre-nephritic hypertonia is important and this can be explained as due to an infectious toxic angiospastic affection of the capillaries. The presence of hepatic congestion and renal pain and further, albuminuria, hæmaturia and casts, completes the pathological picture. Along with marked increase in sedimentation rate, leukopenia was found. There was no clinical evidence of uremia. With suitable treatment prognosis was relatively favourable. The author draws the important conclusion that there is a relation between inflammatory glomerulonephritis and hepatitis which leads him to postulate a nephrotropic virus as the cause.

**SIEDE AND LUZ. [Aetiology of Hepatitis Epidemica.]** *Klin. Woch.* 1943, January 23, No. 4, 70.

The following is a translation of a German abstract of the paper dealt with :—

It has been possible with the aid of the chorio-allantoic method to cultivate from duodenal fluid a filterable, specific agent which destroys chicken embryos on the average after five days within eight passages. Its behaviour marks it as belonging to the group of filterable viruses. The virus has been successfully demonstrated with some degree of regularity in hepatitis epidemica so that it is probably the cause of this disease. (See also *Bulletin of Hygiene*, 1942, v. 17, 703.)

W. P. KENNEDY.

*Reprinted from "Bulletin of Hygiene," Vol. 18, No. 5.*

CANZANI, R. La suerologia de la fiebre ganglionar o mononucleosis infecciosa. [The Serology of Glandular Fever or Infectious Mononucleosis.] *Arch. Uruguayos de Med., Cirug. y. Especialidades.* 1942, February, v. 20, No. 2, 104-29. [51 refs.]

In infectious mononucleosis agglutination of sheep's corpuscles is often observable and has been used as a diagnostic aid; also the sera of patients at times give false positives to tests for syphilis and agglutination of certain bacteria, e.g. *Bact. typhosum* and *Bact. paratyphosum* A and B.

The author has investigated these three dicta. The first, by the Paul and Bunnell technique. Normal sera, inactivated by being heated to 56° C., when added in various dilutions to 2 per cent suspensions of sheep's red cells in saline, agglutinated up to 1:8, rarely 1:16; some cases of acute articular rheumatism and of rheumatoid arthritis up to 1:32; but in acute cases of glandular fever even up to 1:1024, and in subacute cases to 1:256.

As regards the second point: In cases of syphilis inadequately treated, typical glandular fever may appear and subside completely in three weeks and during this time a possible syphilitic reaction may be given, and mask the true disease, but if repeated some six weeks later the W.R. will be found negative. The third point may cause confusion and erroneous diagnosis, for sera of patients with infectious mononucleosis may agglutinate the typhoid group of organisms up to 1:640, although no history of enteric infection or of vaccination is obtainable. As a lymphocytosis is also a feature of both diseases the liability to mistake is even greater and reliance must be placed on hæmoculture, rising agglutination titre and the clinical course of the illness.

H. HAROLD SCOTT.

Reprinted from "*Bulletin of Hygiene*," Vol. 18, No. 5.

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## Correspondence.

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### SKI SURGERY.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Having been for a time an Assistant Instructor at the Middle East Ski School, I was particularly interested in Major J.C. Watts' article in the August, 1944, number of the *Journal*.

I think that most skiers would be inclined to think that the three weeks period of training described by Major Watts is far too short; but experience at the Middle East Establishment supports his view that it is enough for our purpose. In three weeks of the very intensive training organized there by the well-known skier, Major W. J. Riddell, the progress made by men of the right type was astonishing.

I sent six R.A.M.C. orderlies to be trained by him after a preliminary grounding in Mountain Warfare subjects and they soon earned very good reports. They are now in a Mountain Warfare School in the U.K. and the purpose of this letter is to bring their existence to the notice of any who may in the future need R.A.M.C. skiers as they would form an invaluable nucleus for such a unit, being all Nursing Orderlies, II or I, with some six months' experience of skiing.

Field Ambulance,  
B.L.A.,

October 29, 1944.

Yours faithfully,

F. M. RICHARDSON,  
Lieut.-Colonel, Royal Army Medical Corps.



## *Reviews.*

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**TROPICAL MEDICINE.** Fifth Edition. By Sir Leonard Rogers, *K.C.I.E., C.I.E., F.R.S.*, and Sir John W. D. Megaw, *K.C.I.E., B.A.* London: J. & A. Churchill, Ltd. 1944. Pp. x + 518. Price 21s.

This textbook on tropical medicine has been very popular ever since its first appearance, and justifiably so, for it contains most of the essential information in a volume sufficiently small to be easily transportable in a medical officer's personal kit. The present fifth edition maintains its excellent standard of production from a publisher's point of view; the paper is good and the print very easy to read.

There have been considerable advances in tropical medicine since the onset of the war, accelerated by the large number of troops now occupying tropical areas. These have been included in additions to the chapters on malaria, kala-azar, trypanosomiasis and fevers of the typhus group. Perhaps a little more emphasis might have been laid on the value of mepacrine as a suppressive against malaria and mention made of some of its advantages in the therapy of malaria, such as the decrease in the incidence of blackwater fever since its more general use. The term "Infantile or Mediterranean Kala-Azar" is still used in this volume. This term is somewhat misleading, as we now know how frequently the disease in these localities may affect adults.

In dealing with administration of stilbene, the difficulties of intravenous administration are perhaps not sufficiently emphasized. Even when the administration is given in considerable dilution, venous thrombosis not infrequently results.

The chapter on typhus is good and should be studied carefully by those proceeding overseas, for, even with our new method of protection against lice, mite typhus still presents many difficult problems.

Great advances have taken place in the therapy of bacillary dysentery. It is a little disappointing therefore to find that saline treatment is still given priority of place; surely the time has now arrived when the excellent results of therapy with the sulphanilamide group justifies the value of this line of treatment being given more emphasis. The danger of producing emetine-resistant strains of *E. histolytica* is emphasized; this is most important as the results of short ineffective courses of therapy are now causing considerable difficulties to the clinician who has to tackle their treatment in the later stages.

This textbook will be a valuable addition to the library of all doctors proceeding to, or working in, tropical or sub-tropical areas.

**A MANUAL OF DISEASES OF THE EYE.** Ninth Edition. By Charles H. May, M.D., and the late Claud Worth. Revised by Montague L. Hine, M.D., Lond., F.R.C.S. Eng. London: Baillière, Tindall & Cox. 1944. Pp. viii + 538. Price 16s.

Since 1906 May and Worth's Manual of Diseases of the Eye has deservedly been a popular handbook for students and practitioners. Its ninth edition has now appeared under the familiar editorship of Mr. Montague Hine. The book is not by any means an exhaustive treatise on the subject but contains all the fundamental information required for any but the advanced student. Moreover it keeps well abreast of present-day knowledge—such subjects as virus infections, keratoplasty, contact glasses, vitamin diseases and chemotherapeutics by sulphonamides and penicillin being adequately noted.

Its value to the military ophthalmologist is enhanced by the inclusion of a chapter on tropical ophthalmology and another on war injuries including the common casualty from

fragments of glass. One thing in all this modernity stands out oddly—that in the illustrations of clinical testing (as by the Maddox rod) the very inadequate and old-fashioned candle still appears; in the R.A.M.C. ophthalmology has progressed considerably further than that.

**SURGERY OF MODERN WARFARE.** Part VI. Third Edition. Edited by Hamilton Bailey, F.R.C.S. Edinburgh: E. & S. Livingstone. Price 15s. net.

This volume concludes the sections on wounds of the trunk. A short section on surgical diseases encountered in sub-tropical countries, a section on administration and an Appendix conclude the work.

An excellent description of wounds of the large intestine is given by Gordon Taylor. The paragraph at the foot of page 908 leaves one a little in doubt about exteriorization and colostomy. The reviewer agrees definitely with the advice given on the following page in these respects. A little more detail on the technique of the operation of colostomy and the optimum sites might be helpful. The technique and time for closure of colostomies might be included. The section of wounds of the rectum (Gordon Watson and Naunton Morgan) is practical and contains much sound advice.

Wounds of the genito-urinary system are well dealt with by various authors. For injuries of the kidneys, the point is made that, when practicable, pyelography should be carried out, not so much for information about the suspected kidney but to determine the presence of the other kidney.

A short account of sub-tropical surgery (McNeill Love) is given.

An outline of the Medical Services in the British Army is given (T. B. Nicholls). In several details this is now not up to date. Field Surgical Units are referred to but no description of them is given. A C.C.S. nowadays cannot form surgical teams for loan to other formations. A hundred-bedded General Hospital with its own vehicles is certainly not a normal unit.

General Hospitals are seldom capable of sending out surgical teams, because their surgeons are generally fully occupied when the forward units are.

No mention is made of Field Hospitals, Orthopædic Centres or the Base Transfusion Units.

An interesting description is given of wounds in naval action (C. Keating).

An account is given of the hospital organization in the Emergency Medical Service.

The volume ends with an Appendix which is intended to supplement omissions and to review literature which has appeared while the work was in progress.

The need for this addition gives one cause to reflect on the difficulties in bringing out a textbook of this nature in the middle of a war, when constant changes are occurring and new developments are taking place.

J. M. W.

**MINOR SURGERY.** Second Edition. By R. J. McNeill Love, M.S., F.R.C.S., Surgeon, Royal Northern Hospital, London; Consulting Surgeon, London County Council. London: H. K. Lewis & Co., Ltd. 1944. Cap. 8vo. Pp. viii + 392, Figs. 201. Price 15/-

The first edition of this book appeared in the early months of the war and its popularity has been such that a second edition is now published. Extensive rewriting has not been judged necessary, but complete revision has been undertaken.

Mr. McNeill Love contributes nearly one-third, writing on general subjects such as asepsis, wounds and infections, and the remaining portion is by collaborators, each dealing with his speciality.

R. E. Norrish and A. W. Bone cover a wide field of minor operations and omissions are few. The types of operation described are conservative and standard surgical practice, new and possibly controversial techniques being avoided. It is noted, for example, that the rubber tube wound round with ribbon gauze is still inserted in the rectum after the removal of internal hæmorrhoids and is retained until the end of the second day, during which time the patient

has had fluids only by mouth. A reference to the Army blood transfusion apparatus would have been helpful, and a mention of the existence of the Rhesus factor could have been included in the incompatibilities. Genito-urinary surgery is clearly and concisely described by A. W. Badenoch and the chapter on anæsthetics introduces all the newer drugs. Some ninety pages are devoted to fractures and dislocations, and F. P. Fitzgerald does not neglect rehabilitation in the description of after-treatment. A full and adequate index completes the book.

The reproductions, some in colour, are clear and sufficient for the scope of the work and the printing and paper are excellent for this stage of wartime conditions.

This book will appeal to the junior student and the practitioner who is occasionally called upon to perform minor surgery and does not claim to attract the more advanced reader.

H. T. S.

A BIBLIOGRAPHY OF AVIATION MEDICINE SUPPLEMENT. By E. C. Hoff, D.Phil., B.M., B.Ch.Oxon, and John F. Fulton, M.D. Published by the Committee on Aviation Medicine, Division of Medical Sciences, National Research Council, Washington, 1944. Illinois, U.S.A., 301-327, East Lawrence Avenue.

We have received a copy of the above which has been placed in the Library, R.A.M. College.

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### Notice.

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#### ROYAL LIVERPOOL UNITED HOSPITAL.

Royal Southern Hospital Branch (274 beds).

Applications are invited for the post of MATRON to the Royal Southern Hospital, a Branch of the Royal Liverpool United Hospital. The successful candidate will be required to commence her duties as soon as possible after the date of appointment, but if she is serving in H.M. Forces the post will be held vacant until her demobilization.

The Hospital is a General Teaching Hospital in the Clinical School of the University of Liverpool. It is approved by the General Nursing Council for England and Wales for complete training and has a Preliminary Training School for Nurses. It has also a School of Physiotherapy.

Candidates must be fully trained State Registered Nurses and should have had Nursing Administrative experience. Salary and emoluments will be in accordance with the Rushcliffe Scale. The Federated Superannuation Scheme is in force.

Applications, giving age, qualifications, religion, present appointment and details of previous experience, must be accompanied by three recent testimonials, and should be addressed to the Chairman, Royal Southern Hospital, Fazakerley, Liverpool, 9, so as to arrive not later than March 31, 1945.

FRANK SOLMAN,  
Superintendent,  
Royal Southern Hospital.

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Authors are alone responsible for the statements  
made and the opinions expressed in their papers.

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# Journal of the Royal Army Medical Corps.

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## *Original Communications.*

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### SOME RECOLLECTIONS OF ARMY PSYCHIATRY.

By "ALIENIST."

[Received November 13, 1944.]

It has been my fortune to serve some thirty years in the Royal Army Medical Corps. I was employed as a Specialist in Mental Diseases for some seventeen years, of which thirteen years were spent in India. There were then only four such appointments open to R.A.M.C. officers: two at Netley and two in India. Another two in India were held by officers of the Indian Medical Service.

Circumstances were such that our time was occupied almost entirely with the diagnosis, treatment and disposal of psychoses and the more acute types of psychoneurosis. We were "alienists." As time went on and our experience increased, more and more did we become concerned with the importance of Mental Hygiene. For many reasons little was done but it had become obvious, at least to some, that a very close liaison between the Specialists in Mental Diseases and the Hygiene Department was very desirable.

It is a good thing to look back occasionally so that the mistakes and omissions of the past may be rectified. This is, therefore, a very brief and incomplete survey of conditions in India as they appeared to a Military Alienist in the years between the two wars.

The environment in which troops lived in India varied greatly from isolated "men only" stations, such as Razmak and Landi-Kotal on the Frontier; the large cantonments such as Rawalpindi, Lucknow, Quetta, Poona, Bangalore and Secunderabad; the small isolated stations such as Multan, Dinapore and Nasirabad; to the modern cities of Calcutta and Bombay. The hill stations again had their distinctive characteristics not solely climatic. Kasauli may be contrasted with Bangalore.

In some, the population was almost entirely military, in others officials and civilians equalled or exceeded the soldiers, while in the cities the military population was but a small fraction of the European total.

It was very obvious that the military population tended to live a community life, in the country but not of it. The very existence of "cantonments" perpetuated this. The reasons for the origin of this system—hygiene, security, and so on—are obvious. This system emphasized the isolation of the Military community not only from the life of India but also from the rest of the European population. In other words, it brought about a Military caste and, whatever we may wish to believe, the caste system has been almost as deeply ingrained in the British as in the Hindu.

One advantage was that wherever a British unit went, it took its own society with it and the routine life of the soldier was much the same in either Aldershot or Poona. His off-duty life was vastly different. In theory, a unit took with it most that was necessary for the general life of its members and a good station completed the amenities.

I had noticed, over a period of years, that the mental invaliding rate from the south of India was always higher than from the north. It is of interest to compare the typical inhabitant of Northern India with the southerner. Compare the virile Sikh, Punjabi Mussulman and Frontier tribesman with the Bengali Babu or the softer man of South India; but, remember, the south of India also produced the Mahrattas and the cultivators of Deccan are a virile type. There are factors of diet, climate and comparative wealth to be considered. The factor common both to the indigenous Indian and the British soldier is climate. No matter how burning the heat of the Punjab hot weather, there followed the invigorating cold of the finest winter climate in the world. The more constant climate in the south was trying and even the monsoon did not make any great difference. Many found the moist, damp heat much more trying than the dry heat.

Military life in the north was more active than in the south. In the Frontier stations the Army was always ready to deal with the ebullitions of recalcitrant tribesmen. In the "Internal Security" stations of the centre and south the greatest source of trouble was political unrest. The soldier was happier dealing with a fighting enemy than he was in trying to subdue Congress-inspired agitators.

There is no doubt that with the great advance made by general hygiene, both mentally and physically, the health of the soldier was steadily improving. That there was something still wrong was shown by the steady invaliding rate for mental illness and also by the steady suicide rate which, latterly, showed a tendency to rise.

Cholera, typhoid and smallpox epidemics were things of the past and isolated cases were few. The dysenteries were under control. Malaria was, at least, held in partial subjection and the principles underlying eradication were understood. That they were not always carried out with the desired thoroughness was due in part to remediable shortcomings in authoritative outlook which, *inter alia*, neglected the psychological approach to preventive methods. There were, also, financial difficulties.

To the newcomer, the necessity of attention to the minutiae of preventive detail was apt to prove a burden to the flesh and a weariness to the spirit. It soon became a matter of routine and habit once the necessity for such detail was recognized. Sleeping under a net, boiling drinking water, protection of food from flies and so on, all became accepted as part of the daily routine. So also did one's daily onslaught on, and protective measures against, the mosquito. The mosquito was, in peace as in war, Enemy Number One. Enemy Number Two in peacetime may well have been the Brain Fever Bird! In latter years the importance of an adequate and balanced diet was generally appreciated and steps were taken to ensure its availability. Units were paying greater attention to the quality of food, its preparation and cooking and, wellnigh as important, its serving. In some instances the restaurant system of serving meals had been introduced with outstanding success. In a country such as India, the attractively served meal in cheerful and bright surroundings is even more important than in England. There were Government Dairy Farms for the supply of pure milk, cream and butter. A very promising Cold Storage Scheme for meat was nipped in the bud only at the last moment by unfortunately aroused Communal difficulties. Every cantonment in India had been electrified with the resultant electric fan and household refrigerators. The eviction of the kerosene butti by the electric lamp was a milestone in progress. The psychological effect of these improvements was incalculable.

To be sure the use of refrigerators was not universal outside the cities, but they were becoming a practical possibility and no longer a curiosity. They should be in every regimental cookhouse in peacetime.

Barracks and quarters were steadily, although slowly, improving. Housing conditions for officers in Bombay left nothing to be desired, but the smaller up-country station was not

quite up to that standard. Mosquito-proofed barracks and fly-proofed kitchens were coming into being ; tentative experiments were being made with air-conditioning.

All this was to the good and there is no question that general conditions of life in India were improving and that this was leading to an improvement in the mental outlook. Many causes of anxiety and worry were being steadily removed by a Hygiene Department who did not always realize the psychological value of their work.

There were other improvements. The regular sea mail was supplemented by the all up letter air mail. The general amenities of barrack life were improving. A Major-General of the Indian Army once told me that, in his young days, the only place in which a British soldier could secure quiet was in the Prayer Room. There are now canteens, recreation rooms, Serjeants' and Corporals' Messes and other amenities. There are good games grounds and, occasionally, swimming baths. The cities and larger cantonments have good cinemas and the standard of itinerant concert parties was improving, but there were marked inequalities between stations. It may be left at that.

Probably conditions for the officer caste had improved more than for the other ranks (there is still an Indian Army Form which refers to Officers' Ladies, N.C.O.s' wives and Other Ranks' women).

Again, conditions varied greatly but I have never lived more comfortably and been better housed than in an Army flat in Bombay, but Bombay is not " India." It is a modern, cosmopolitan city set against an Indian background with all the amenities of our so-called civilization—a pure water supply, water carriage, sewage disposal, electric light and power, air-conditioned cinemas, good hotels and restaurants and very good shops with, in peacetime, a plethora of cold storage foodstuffs. To see India one had to be stationed in, say, Multan, Fyzabad, Benares, Ahmednagar or similar isolated communities.

For a variety of reasons there was coming a very gradual breaking down of the barrier between the European and the Indian. The difficulties attendant on this can be fully appreciated only by those who have lived in India.

With all this to the good, there still remained much to be done.

One's daily life in India did not vary a great deal from day to day. Work usually ceased at midday and from then on there was little to do except pass the time away. The method depended on the individual and, in the case of troops, on the interest, keenness and initiative of their officers. In some units a great deal was done with organized games—in others not so much. To describe what was done and the possibilities of more being done is beyond the scope of this brief article.

The greatest difficulty was the lack of any serious attempt at organized intellectual recreation. One's energies tended to be occupied in simply passing the time, and a great deal of energy was wasted in the interminable gossip of Club life. Many officers did a great deal of professional work, considerable research and other useful activities, but the temptation to do little beyond routine was very great. That so much valuable medical research work was done reflects the greatest credit on our Corps, but it tended to be individual. With routine evening visits to hospitals, etc., an R.A.M.C. officer could lead a really active life.

Courses of lectures were arranged at many stations and there was some attempt at organized intellectual instruction—lectures by experts on various subjects, etc.—but this was neither general nor extensive. In some places these courses of lectures were of a very high standard and were attended by officers' wives. So far as the troops were concerned, there was all too little.

Figures, kept over a period of years, showed that there were stations with an incidence of mental cases consistently above the average. There would also be a unit with an invaliding rate higher than the average. When the two coincided there was always trouble.

It was seldom that any attempt was made to do a psychiatric survey of the men in any unit. I tried this, tentatively and not very thoroughly, on two occasions. The Commanding Officers co-operated by allowing access to the conduct sheets and by submitting names of unsatisfactory soldiers. On each occasion I was able to eliminate some half dozen men with

the result that, at least for the next two years, there were no further cases of mental trouble from that unit.

My experience of this satisfied me of the value of what I might call a " Psychiatric Survey " of a unit and of the value of some form of selection and weeding before troops are sent to garrison duty abroad.

It is almost a fact that, in the twenty years between the two wars, the equivalent of two infantry battalions were invalidated from India on account of mental trouble. It may be deduced that many who were really mentally unfit for the stress of active service remained with their units. A scheme for the complete re-organization of the mental side of Army medical work in India was prepared and submitted. It was approved in principle by the Medical Directorate and the Adjutant-General but " funds did not permit " and it doubtless now languishes in a file at Army Headquarters unless the " poochis " have eaten it. Stress was laid on prevention rather than cure.

The incidence rate of psychoses among British troops in India over a period of fifteen years was approximately the same as the incidence in the same age-group of the male population in England. It will, therefore, be impossible to eliminate cases of psychotic illness from an Army of Occupation unless a rigid selection is made. Whether this would prove completely effective, I venture to doubt. It would eliminate many potential psychoneurotics.

Once we have our selected soldiers in the tropics, the maintenance of mental as well as of physical health is of paramount importance. The relationship of mind and body is such that a high standard of physical hygiene is essential for mental well-being but we need to go further.

*Note.*—The mention of any military station is solely to indicate a type. Such places as Quetta, Karachi, Lahore, Kasauli, Wellington and Deolali had their individual characteristics. In the main there were five main types : (1) The large military cantonment ; (2) the Frontier station ; (3) the small country cantonment ; (4) the city ; and (5) the Hill Station. No mention has been made of the " cold storage " scheme by which troops in the Punjab and the Ganges Basin spent most of the hot weather in the Hills. Indeed, anything like a complete psychiatric survey of conditions in India during the inter-war years would need a volume of its own.

## THE FUTURE OF PSYCHIATRY IN THE ARMY MEDICAL SERVICE.

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THE Officers of our Corps will one day recall with pride the courageous way in which the Army has used the sciences as aids to the Medical Service in this war, and none has been more necessary or more widely applied than the lusty youth among the medical sciences that is known as Psychiatry. The Army has been first to provide an extensive out-patient service, has applied psychiatry to the close scrutiny involved in the selection and placing of its personnel, including the choosing of its commissioned leaders. It has been applied by the Army to its medico-legal problems in a most advanced fashion—to the early ascertainment and treatment of mental defect or disorder. Indeed, the Army has applied psychiatry to the close examination of the soldier's everyday life, from his recruitment and training to his progress overseas as a trained soldier; has followed him into battle, in victory and in defeat and even beyond the enemy lines into the bitter term of imprisonment as a prisoner of war. For there has not yet been any fighting Army of the Empire which has not welcomed expert psychiatric help with regard to certain problems raised almost at once by difficult personalities which are seldom understood by the fighting man and his leaders. These personalities express themselves in every sort of curious conduct and impose a great strain upon comrades in war. Such conduct may vary from inexplicable changes of mood to an inability to learn; from a strange failure to settle down in the military machine to downright delinquency. Experience of battle will result in further problems for the fighting leader. He finds that for reasons he does not understand there are men who are quite unable to endure the physical and emotional strains imposed by action and he sometimes resents such men being treated as medical cases.

These and other facts mean that the future Medical Service of the Army must maintain, on more than a purely physical level, the keenest interest in the quality of the human material coming into the Army. It must be recognized by all of us that men and women entering any branch of the fighting Army, or its Services, must be truly selected for service, never admitted to Army ranks because of unsuitability for other work. With the speed and complexity of modern war and its weapons the fighting man has become a skilled technician and must possess the intellectual equipment necessary to the learning of his trade.

It follows that the officers of the R.A.M.C. must acquire knowledge of methods of the testing of intelligence and of assessing the material concerning character that can be collected from a close study of personal histories from childhood to adult life. The study of infancy, childhood and adolescence will often reveal weaknesses rendering a given individual quite unsuitable for acceptance for service in a fighting Army. It is not enough to listen to the heart, to measure chest expansion, and to ensure the absence of rupture and varicocele; something must be learned of the innate and acquired abilities of every recruit. Much of this requires further research which will be assisted by the compilation of careful records and a system of filing enabling the career of the accepted soldier to be followed throughout his service.

Then comes the period of training. The individual must not be drafted casually into this work or that in the Army. Apart from personal predilection, his abilities must be used to the best purpose both for him and for his country. Officers of the Corps must know something of the principles of selection so that square pegs are not fitted into round holes. This will entail some familiarity with what is known as the "job analysis" and a full and detailed knowledge of the many aspects of Army life.

The period of training besides being a great physical adventure to a recruit can also be made a time of potential mental growth. Just as the young soldier grows in stature and in



strength, expands his chest and his powers of endurance, so his mental life should enlarge its horizons, appreciate the acquisition of new skill and the wide national and Empire issues in which that skill may perforce be used. It must be part of the privilege given to medical officers living in close touch with men under training to ensure that as much as possible is done to make the young soldier enjoy and even love the profession of arms, even though his profession may be none of his choosing. The soldier's medical officer must be familiar with the psychological discomforts common to nearly all newcomers to an Army. They include the sense of loss of privacy, loss of individual freedom and, perhaps worst of all, the inevitable loss of the home circle. These matters are worthy of intense and detailed study and it may well be that some form of universal military service may require these and similar matters to be treated with expert psychological insight which will presuppose on the part of the Army doctor a grounding in the mental mechanisms that underlie human behaviour. He must be able to teach in simple terms the combatant junior leaders with whom he lives.

But apart from the principles underlying selection and care in training, the Corps as a whole must take a constant interest in the human problems that arise as a result of action, the final test of the fighting man and the units of which he forms a part.

We know that with a high standard of military training and leadership psychiatric casualties in battle will be low. We know that to secure that confidence in themselves and their leaders which enables men to win battles and campaigns a plentiful supply of the best and latest equipment that science and industry can produce must be assured. We have learned the essential lesson of co-operation between Services, and the vital necessity of air cover for the men on the ground and the ships on the sea. And we ought to know that given all these things psychiatric breakdown will still occur—for man can never be a machine. The conditions of battle on beaches, in close country, in jungles, tropics or arctic cold all have their peculiar stresses and could reduce any one of us to an exhausted confusion of mind which would cry out for understanding therapy. Yet our younger colleagues who are normally attached to fighting units have often seemed strangely unable to recognize and handle such medical cases, no doubt due in part to gaps in medical education which the Corps must set itself to fill. It is obviously impossible to turn every medical officer into a Specialist in Psychiatry. Fortunately such a procedure is quite unnecessary. The ideal to aim at is to try and ensure that immediately psychiatric casualties occur in troops in action the medical officers on the spot have sufficient training and knowledge to apply appropriate treatment forthwith so that no neglect in the important early stages may assist the fixation of the soldier's symptoms. Officers of the Corps must also acquire the ability to seek for and find the most apparent of the causes of breakdown so that, by appropriate advice to his combatant commanders, adequate preventive measures may be taken as soon as the military situation allows. Psychiatric breakdown in fighting troops is so often a lesion of morale—however temporary. Morale in war, and no doubt in peace, is inevitably linked with the mental health of the group. The care of that mental health in the Army is partly the concern of the medical officers and may be regarded as mental hygiene. In many respects mental hygiene is more important than physical hygiene and no one now doubts the importance of hygiene for the physical welfare of the troops in the field. Mental hygiene involves the constant observation and care of the soldier in training, in peace and in war, and in his social relations as a citizen. And should the soldier suffer breakdown, his treatment and rehabilitation are both urgent matters for the soldier's doctor.

How are members of our Corps to attain such knowledge? It is to be hoped that the Royal Army Medical College will in the future accept the task of instructing the young doctor who desires to enter the soldier's Medical Service. The College with its progressive teaching outlook is here on the very threshold of fresh opportunity and endeavour. With the proud position it holds for concern with every aspect of the welfare and well-being of the soldier, the teaching of the principles of military psychiatry should surely be added to the subjects of the newly-commissioned entrant. He should have the opportunity of learning not only the elements of selection, but the current methods by which selection is carried out. He must

be taught to look for the psychiatric danger signals in the history and personality of individuals which should lead to rejection for a fighting role in military service, be they officers or other ranks. The young medical officer should be as familiar with the first-aid treatment of psychiatric casualties as he is expected to be with the first-aid care of physical wounds. He must be taught about what is known as morale and discipline and their relations to each other. He must learn to appreciate the sinister meaning of psychosomatic sickness as having emotional sources which may be of serious import in fighting units.

Some of this work requires practical first-hand experience so that the teachers at the College should have access to a modern psychiatric unit and to the departments concerned with the selection of personnel. The teaching at the College should not content itself merely with treatment and preventive aspects. The common mental mechanisms must be explained and applied in studies of mass movements and national characteristics. The future doctors of the Service may well be asked to submit studies of the character of our enemies, perhaps to advise on the psychological effects of weapons, optimum hours of work and similar problems. The College has a great opportunity for the teaching of social medicine at a time when it exercises a wide and powerful influence ; such a step will require courage, a quality the Corps has never lacked. A similar effort will be required to establish mental hygiene as an important feature of the medical officer's training as had to be made to demonstrate the value of hygiene. "What does the soldier want with soap?" asked a senior officer not so many years ago. One can perhaps be permitted to hear his counterpart asking the question "What does the soldier want with this 'trick-cycling'?"

## PSYCHIATRIC ASPECTS OF REHABILITATION.

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In consequence of a number of visits to a variety of hospitals, training centres and convalescent depots, both military and civil, it is possible to put forward in an interim report a number of observations on the efforts of rehabilitation, which have been made at these establishments, with a view to putting the subject upon both a scientific and humane basis.

At the outset one must ask, are the methods used to-day any different from those of earlier days? Indeed, are they merely dressed up in the new guise of a word which has merely served to cover all principles and practices, making the necessary proviso that to-day's improvements are not due to a new outlook but to the march of time under the banner of scientific advances in technique?

Medicine in the past honestly pursued the goal of cure and physicians and surgeons knew in those days that a "cured or alleviated patient" was better able to return to home or work. They, too, were not oblivious of the art of rehabilitation but they expected the patient to work out his own salvation when his appendix was removed or when his fracture was united. Rehabilitation to-day should be based on an awareness on the part of the doctor that the cure or treatment was carried out in the light of the function or role of the sufferer as a member of a community.

Rehabilitation must, therefore, be defined as *the planned method of treatment designed progressively to mobilize all the available resources of the patient with a view to his most complete adjustment to social and economic needs.*

### PHYSICAL MEDICINE.

The following tentative suggestions are put forward regarding the assistance which psychiatry can give in the matter of training of physical therapy workers.

All nurses and physical training instructors attached to neurological, physiotherapy and orthopaedic departments, not to mention general medical rehabilitation units, should be given some formal instructions in the mental aspects of their work. The object of such education should be:—

(1) To enable these workers to become aware of the necessity of their interest in their job and to gain insight into the special relationship which exists between themselves and their charges.

(2) To understand the problem of co-operativeness and non-co-operativeness of patients. Psychiatry has much to say and to teach about the unwilling patient and still further to study the incentives or obstacles to recover in soldiers in particular.

(3) To allay a patient's anxiety as to pain, and to recognize retrograde tendencies and their meaning, e.g. desire to rest after exertion, to lean readily upon the therapist and to show resentment or anxiety where a therapy is being stressed or hastened.

(4) To understand the nature of encouragement and criticism, and to realize the effects of the authority role of the therapist.

(5) To recognize when tardiness in recovery is due to:—

- (a) Physiological sluggishness (malnutrition).
- (b) Neurotic defences preserving a protective or defensive symptom.
- (c) Personality traits, e.g. intellectual hypercriticism of the method. Self-centred attitudes. Persecutory or paranoid opposition to another's authority.
- (d) Malingering-delayed recovery.

(6) To recognize certain characteristic reaction types which may call for special handling, e.g. :—

- (a) Those who defend themselves against the therapist's judgment and put up a constant barrage of counter suggestions.
- (b) The dependent discouraged type who always battens on the therapist and has his anxiety aroused over any severe setback.
- (c) The depressive who feels recovery is doubtful and does not build up on any minor progress made.
- (d) The self-centred who want the undivided attention of the therapist.
- (e) Hysterics who unconsciously simulate and create new symptoms to retard recovery.
- (f) The psychopaths who miss treatment, who lie about their progress, who interfere with bandages, who may show characteristics of any types from (a) to (e), and finally,

(7) To recognize the fact that most therapies applied to human ills are rituals and arouse in patients unconscious enthusiasm and hostilities regarding the magical and the mysterious. A most important topic inasmuch as patients must be made to realize all the time the reality character of the treatment. Therefore to win them from treatment to vocational activity and then to functional practices and earning power which is the result of therapeutic co-operation.

The role of physical medicine has been given special consideration because by far the largest number of casualties in war are concerned with disorders of the limbs occasioned either by actual gunshot wounds of upper and lower extremity or with disorders of locomotion and dexterity secondary to cerebral injury. In addition the debilities following other surgical conditions and the systemic diseases call for the help of this department. In this sense, therefore, physical medicine serves an important, specific, yet in many respects a very general function. Its importance lies in the fact that its practitioners, making contacts with various fields of medicine, are skilled in the assessment of disabilities calling for restoration of neuro-muscular functions in a general sense and with the varying degrees of malnutrition and lowered vitality which techniques of physiotherapy are designed to meet. But while the physiotherapist himself and his skilled assistants know the scope and limitations of the specific techniques, they need above all to take into account the personality factors which determine willingness to recover and capacity to assume a working role—that is vocation. These latter considerations are the proper study of the industrial psychologist and the psychiatrist. For example, in the early states of recovery the problem of fatiguability is of paramount importance, and its varying manifestations make it a matter of importance to decide to what extent it follows from the specific lesion or in what measure it is a function of a personality factor. For practical purposes the term fatigue is used by most of us to describe our feelings. The most superficial introspection will show that, in fact, the sensations referred to as fatigue are exceedingly different sensations, e.g. fatigue of a short run, a long day's work, a short spell of work on hot moist days. They are different sensations and they correspond to different physiological states, so different that it is entirely correct to say that there is no such thing as fatigue, but rather a great many fatigues. There is no single factor common to the sensations we call fatigue. What we probably need is a word to describe a characteristic of the organisms as a whole—the sensation which appears when, for any reason, the organism is approaching breakdown. The word will be found to include all those factors, including the environmental ones which include a man's attitude to the task, his skill and his consciousness of his ability to carry out the skill in the most productive manner.

In each department of medical and surgical disorder there are rehabilitation limits. Doctors and surgeons, as such, cannot be expected to administer themselves the vocational training that each man may require, but up to the limit of his knowledge of the type of man

he handles, be he soldier or workman, he can say and should be able to say how much residual function is left to enable the man, in a given age group, to work within the frame of his trade or Army craft.

He may not be in a position to say in what particular section of the trade he can work, but he might be able to say what he definitely cannot do.

It is notorious that in the mining industry no one with residual lesions can work at the coal face. Although every doctor has a human right to be a moralist and disciplinarian he cannot arrogate to himself the right to say what a man must do, but merely what he can do.

The strictly non-medical and surgical factors which influence rehabilitation aim at this phase of recovery. They are :—

(1) The level of intelligence and degree of trainability following from the intelligence level.

(2) Personality structure enabling a man to cope with recurrent difficulties due to probable demoting, diminution of pay and interruption of group affiliations, consequent upon his period of sickness.

(3) The man's ability to adjust himself to any new socio-economic setting necessitated by the nature of his disability. This is true particularly of soldiers of the better type who are loath to break with old regimental associations—friends, loyalties.

(4) The extent to which a man can build a new edifice of craft skill above the level of the base line of his former occupation.

Is there a critical point in the ladder of rehabilitation before which it is undesirable to stress the vocational goal? It has been held by some theorists that rehabilitation starts at the moment when a man receives his wound or injury and he is seen by the medical officer. This is true but with an essential qualification. On the battlefield, rehabilitation probably begins with the combatant officer who encourages a man to play some part even with a minor wound or with a transitory degree of emotional shock. But no sooner is a man evacuated as being unsuited for the fighting role than his psychological adjustment is profoundly disturbed. Not only does his physical injury debar him from all participation, but he loses his mobility, he suffers pain and is suddenly separated from his group relationships. He is in a state of suspended animation. In place of a steady lifeline of activity with established vectors of stress, strain and responsiveness, he enters a new phase in which primitive types of response govern the behaviour of both mind and body; from now onward his path to recovery, though a continuous one, assumes a series of oscillations. One phase in this curve of progress is governed by very elemental if not elementary processes of recovery. It is governed by the dominance of self-preservative processes, relief or shame at being removed from dangers, obligations, group demands, etc.

The next phase is the period of restitution of the general powers of the body during which the doctor aids the patient and nature with his special surgical and medical arts. The injured child becomes the recovering man, and thence the recovering man becomes the potential craftsman. H. E. Griffiths, in his Hunterian Lecture (May 5, 1943), specifies the five fears of a workman which may stand in the way of recovery. Fear of pain, financial loss, unemployment, de-grading and litigation. Unfortunately in military life the fears do not correspond. We must painfully admit that fear of recovery to return to the battle zone is not unknown. But, nevertheless, the specific fears of the soldier play their own particular part. Where morale is high, as in the soldier who returns battle-scarred with pride in his achievement, recovery from physical injuries is uneventful in the absence of septic complications. Justifiable relief from the strain of battle engenders a desire to lie back and tacitly to enjoy the lesion as a mark of soldierly experience; but other psychological trends contribute to maintain morale and with it the will to recovery. These are chiefly satisfaction with one's war achievement—"These wounds I did receive upon St. Crispin's Day." This attitude is encouraged by the atmosphere of the military hospital, its doctors and nurses, backed by the social attitude of others who, through the soldiers' sacrifice, enjoy a quasi-mystical participation which helps to alleviate their own non-combatant guilt. But this ill-defined attitude

cannot be long sustained and certainly, in the absence of conscious ideology to support it, the soldier on the way to recovery cannot be continuously bemused by an atmosphere of what is frequently false cheerfulness and well-being. He awaits return to his unit and probably active fighting, and the sooner the regime of rehabilitation is coloured by reality, its obligations and vocational techniques, the better. The days of recovery must be planned and the design must be filled out with a nicely-balanced regime of physical and mental exercises, punctuated by carefully thought-out periods of rest. Rehabilitation technique must be governed by short and long-term policies. At this stage of the war, long-term ideas can be safely entertained because the hopes of returning ultimately to civil occupation are no longer a mirage and, for the community as well as for the soldier, fitness for eventual social usefulness should be used as an incentive to uninterrupted recovery. Indeed, such incentives are not out of keeping with return to duty. It is therefore important that at this stage all therapists involved in rehabilitation should make a study of the psychological character make-up of each soldier on the lines of those laid down in a previous passage. The defiant man almost disassociating himself from his injury must be differentiated from the resentful and the depressed. It needs repeating that recovery depends upon the therapist's appreciation of these factors which may explain, other things being equal, the slow recovery from the otherwise uneventful convalescence to the phase of usefulness.

A vital factor in maintaining a high level of well-being and purposefulness is a sense of group relationship. In Army life the wider community is a living network of inter-personal relationships held together by ties of common loyalties and affections not to mention economic ties and aspirations. The following suggestions with regard to the organizations of the group life of recovering soldiers require perhaps more careful consideration than any that can be put forward in civil situations of an analogous kind. The civilian casualty has never entirely broken with his factory or his work, whatever it may be, and in addition he has the overwhelming incentive to return to wage-earning and to maintain the skill without which he either cannot earn or has his earning powers reduced. He maintains his contact with his employer on whose goodwill he relies and, in addition, if this goes by default, he has the support of the Trades Union, the Friendly Society and the Law which will adjudicate for him in the event of a conflict over claims and sickness maintenance. In the Army, however, he is subject to a system which promises little beyond his daily maintenance, his medical needs and his return to the strains and hazards of service. One's morale must be high when all that can be promised is blood and sweat, the tears of one's family, and the short-lived enthusiasm of one's fellows. Hence the vital need for organizing and maintaining the group life of the soldier at all stages of restitution.

Admitting certain essential differences as exist between neurotic patients and surgical patients, there are certain human problems common to both. Of the neurotic's rehabilitation, some further submissions will be discussed later. Bion rightly says, "a psychiatrist who knows the life of a unit in the battle zone will be spared the blunder of thinking that patients are potential cannon fodder to be returned as such to their units. He will realize that it is his task to produce self-respecting men socially adjusted to the community and therefore willing to accept the responsibilities whether in War or Peace. Only then will he be free from deep feelings of guilt which effectually stultify any efforts he may otherwise make towards treatment."

In a large measure the rehabilitation problem in the early stages of recovery from active lesions and the stage of mobilization solves itself. The patient is not autonomous because the very art of surgery and medicine claims the injury as much as the patient himself. But even this stage should be one of co-operative enterprise as between patient and doctor, otherwise the patient may well say "here is my wound—heal it." But, fortunately, the day is filled up with dressings, exercises and therapies of a kind, evening games, outings, entertainments. Unfortunately, much of this is passive and so fills the day that the patient has, for the time being at least, little time to think and little opportunity for responsibility. Patients should be made to work with the ward sisters in framing treatment programmes and

dovetailing them in with amenities and entertainments. Entertainments should be provided as much by the patients as by visiting theatre companies. Within reasonable limits the men themselves should be free to select cinema films from agreed lists of serious and light programmes. Methods of cure should be openly discussed by the doctors in language suited to every man. By this means, at this early stage, men are accustomed to a co-operative enterprise, free with criticism and with constructive ideas outside the purely medical field. This prepares the patient for the next stage when his mobility allows him to think in terms of his future vocation as a soldier—both as technician and group member. The convalescent depot now, and at this stage, becomes populated with men who can think for themselves and with others. Moreover they are now able to feel more consciously their group membership, its obligations and privileges. One had the opportunity of noting at convalescent depots that while the establishment was legitimately organized on a company basis, the company officer was too prone to become the custodian of his men and not the combatant officer leader he rightly is in the field. This is largely due to the fact that the medical and non-medical officers are working at parallel purposes with rarely more than an occasional tangential point of common interest from time to time. Furthermore, periods of convalescence are brief; officers do not get to know their men and the group spirit is organizational rather than organic, for the men from various disparate units have little more than fleeting and accidental ties and few bonds of technical interest. They have, however, common ties of a negative character which bind all people together in adversity. This should be capitalized. For example, they share resentment, misgivings and have common domestic problems; this is the cement of the band of brothers in league when they have to share a group conception of a bad image of authority.

This can be exorcised by the establishment of a company forum where the men can daily shape at least part of the routine programme, see that they themselves administer the "justice of fatigues," and have an opportunity to voice discontents. Over these group gatherings the company officer and his N.C.O.s can preside as at a joint enterprise. The hierarchy of authority should still reign but only on the parade ground and during para-military and military exercises. Though men come and go—they fall into a working space which is not entirely alien to them because they see already there soldiers like themselves. By this means, the officers of a Convalescent Depot are not spectators of Rehabilitation but its participants.

#### I.—THE LIMBLESS SOLDIER.

This subject has received the full attention of Major E. Wittkower in the form of characterological studies of men who had amputations of upper or lower limbs of varying severity in the course of battle action or in other fields of military service. Nevertheless it is clear, and Major Wittkower admits the fact, that the vocational problem remains a large one. The amputee has a specific problem. He has lost mobility if he has lost a leg, he has lost manipulative power and dexterity if he has lost an arm or hand. Moreover he has returned with a fraction of his body removed, which must have social repercussions.

In this field, therefore, there is an urgent call for :—

- (a) Vocational testing with intelligence grading.
- (b) An industry-wide job analysis in order to facilitate vocation guidance or redirection both in the Services and in industry.
- (c) A further study of the neuro-psychiatry of the recovery of the body-image and its reconfiguration to meet the amputated state. A man may become bogged in a certain industrial vocational groove, whereas prognosis of body-image recovery may cast a light on his long-term capacity to do work for which in the early stages of recovery he appeared to be unsuited or destined never to be suited.
- (d) Characterological studies of men who some time after returning to industry have or have not made satisfactory adjustment.

## II.—SPECIAL PROBLEMS OF REHABILITATION OF THE BLIND.

(1) Workers with the blind in initial stages might well be themselves chosen from victims with some high degree of visual defect so that they appreciate the handicap and, from their own progress towards readjustment, can give the blind man useful hints and examples of recovery of economic usefulness.

(2) Researches are needed to look into the difficulties of orientation.

- (a) The problem of Braille reading and what is the minimum time for training men in the use of this novel and, at first, difficult means of acquiring the art of reading.
- (b) The speed with which different men acquire the "sense of the obstacle" common to blind persons.
- (c) The acquisition of profitable skills which will enable the man to win back his self-respect through economic usefulness.
- (d) The education of the family of a blinded victim in the methods of handling and accepting an afflicted relation.
- (e) The extent to which long and short periods of special institution treatment are better or otherwise than early incorporation in the working life of the community. It is important to ascertain whether men who are blind acquire the ability to work more speedily and skilfully with their fellows in affliction, or in association with normal fellow-workers.
- (f) Does the knowledge of reaction types help materially in adjusting men in the mass or is it more profitably utilized where individual cases present problems arising from temperamental and personality variations?

## III.—THE CURE OF THE DEAF.

Men with head injuries involving deafness are much more likely to be convalescent from severe medical illness and complicating wounds than are the blind and are usually, in consequence, subject to longer periods of hospitalization.

Rehabilitation for these calls for early study and consideration while in hospital. The effect of deafness on personality has been known for some time to be more profound than blindness. There is no need to stress the call for early diagnosis of the degree of deafness by audiometer tests and tests for spatial orientation, but above all the destructive effects on personality call for very close study. Inasmuch as speech is the essential bond of union between persons, the victim of deafness suffers from seclusiveness consequent upon living in a mental vacuum, and whatever be the varieties of character structure with which the subject is endowed, psychiatrists are in agreement with otologists in appreciating the paranoid trends incubated by this affliction. Every effort should, therefore, be made to acquaint the deaf as soon as diagnosis is confirmed with the nature of his disability and the need for early acquisition of lip reading. Furthermore, the common command of speech itself tends to undergo deterioration, and the presence of a speech therapist cannot be sufficiently stressed for all hospitals having a large number of deaf patients. The fact that deafness is frequently more profound in a general sense, due to emotional problems, makes it equally desirable for a psychiatric opinion to be given in all doubtful cases.

Lastly, it must be noted that human sympathy for the deaf is not so forthcoming as for the blind, and it is therefore necessary that personnel dealing with deaf soldiers should be carefully chosen and/or educated to appreciate the psychological and social problems of the deaf.

Vocational training will call for special criteria of trainability,

(1) The deaf cannot be set to tasks in which the recognition of sounds of machinery and the "ring" of materials is all important. Certain kinds of clerical duties are open to them but others are not. For example, the deaf will be useless for shorthand taking, but adequate as ordinary typists.

(2) Spatial orientation is disturbed if not actually lost, and although human hearing is



not highly geared as it is in animals to appreciation of the exact source of sounds, there is a disturbance of dextrality and sinistrality which rule out certain kinds of work on machinery.

*Social training.*—This cannot be underestimated in a condition which disturbs inter-personal relations so profoundly, and, as early as possible, the sufferer must be aided in cultivating human contacts by recreative work both in and out of doors and by the provision of adequate occupation therapy designed to discuss what a man can do and not merely to give him something to do.

#### IV.—REHABILITATION FOR PULMONARY TUBERCULOSIS.

The recognized chronicity of this condition and the need from time to time to withdraw the patient from his current method of obtaining a livelihood make of it a problem which is never entirely separated from the purely clinical field. That is to say, the tuberculosis specialist might say, with good reason, that a patient cannot be safely viewed in the light of economic capacity as long as exacerbations are from time to time calling for chest inspection and very specialized minor and major surgical attention. Nevertheless there are certain recognized attitudes of the tuberculosis patient which render his management a concern of the first magnitude.

There, again, it would be unwise and perhaps dangerous to ignore the complex ætiology of pulmonary tuberculosis—the nutritional, social and economic factors, and to stress psychological factors is not to ignore these other and probably prepotent factors. Nor does it suggest that recondite analysis of the patient's past must always be resorted to in order to aid recovery. Rehabilitation is admitted by most clinicians to be tied up with mental attitude and therefore a knowledge of the reaction type is necessary in order to make the wisest plan for a patient's future and indeed for his present regime.

It must surely be obvious that the enforced rest may be injurious to a man of active disposition; rather a regime of measured activity for him than a life of enforced idleness which will give rise to mental agitation and the autonomic disturbances which go with it. The old view that the tubercular patients were imbued with hope (*spes phthisica*) is largely discredited, and the "*ardor phthisica*" probably conveys a better picture of the urgency, ambition and drive which characterized many before the disease took hold and enforced a slackening of effort. Or perhaps a disappointment or frustration has put a self-imposed brake on activity—a kind of suspended animation of which the other factors of the disease took liberal advantage.

It has been demonstrated how such communal establishments as Papworth Colony meet some of the social requirements of tuberculous patients, i.e. economic activity, continued family life, in short many of the differentia of normal existence.

The sanatorium is by no means such a regime. It is unnatural, unsocial in the strict sense, in that as a "society" it lacks most of the distinguishing features of a social group, i.e., differentiation of function and normal inter-personal relations. Although stays in sanatoria are temporary, they have some of the qualities of permanence. The stay has too much of the quality of a retirement. Occupations are largely diversional and of limited range. It may well be that the sanatorium shows many characteristics of a prisoner-of-war camp—only the best, the most ardent, and the most constructive members come out unscathed and ready to live full social lives again. If sanatorium treatment is, in the very nature of the disease, a necessity, the post-sanatorium treatment becomes a necessary part of rehabilitation. But it is clear that the two stages should be seen together and, for this, the sanatorium regime calls for very radical modification.

#### V.—DERMATOLOGICAL CONDITIONS.

A visit to an Army Centre for rehabilitating a number of more or less intractable cases of skin afflictions revealed many interesting points.

Much of the progress made in all cases at the Centre was admittedly due to the efforts of

the female staff who helped the men to overcome the feelings of isolation engendered by the complaint. They made the men feel that their trouble did not render them pariahs, and dancing with them at the occasional entertainments confirmed them in the belief that women were not prone to reject them because of their skin trouble.

It would be unwise to dogmatize as to the particular psychological make-up of dermatological patients but anxiety in varying degrees of severity typified some and a pronounced self-centred disposition typified others.

The following recommendations are suggested with regard to necessary researches to substantiate the psychological factors in skin conditions and to strengthen the suggestions with respect to the best possible regime for these conditions :—

- (a) A study of the psychological factors in occupation dermatoses, i.e. both emotional and intellectual factors. To include khaki dermatitis.
- (b) A study of the psychological factors both emotional and intellectual in infective dermatoses.
- (c) A study of the emotional and intellectual factors in infection dermatosis of venereal type.
- (d) A study of the emotional and intellectual factors in seborrhœac eczema, psoriasis, etc.
- (e) An investigation of relation of heat regulation and autonomic function in the above groups. To include study of effect of hyperidrosis in these groups.
- (f) An investigation of social background including a genetic study.

#### VI.—THE NEUROSES.

In the handling of the neuroses of civil life, diagnosis, treatment and rehabilitation are inseparable. The earliest diagnostic phase is one during which the doctor realizes the reaction type of his patient and therefore what are his working maxima and minima in the world of work and what are his social potentialities. To a large extent this should be, at least, equally true of Service patients. In fact, in as far as the Medical Officer who sees a patient at an Exhaustion Centre has, or should have, some standards regarding the minimum requirements of a soldier of the basic arms (Infantry, Armoured Corps, R.A.S.C., Recce and Engineers), he should be able to prognosticate whether the man can be eventually rehabilitated after sedation and rest, or whether he will be a likely soldier after a more or less short period of evacuation from the battle zone.

Within the terms of reference of a psychiatric case, there are these groups for rehabilitation.

*Group I.*—Is there so small a degree of predisposition that immediate rehabilitation is possible after a period of rest and reassurance ?

*Group II.*—Is there such a degree of predisposition that immediate rehabilitation to the front line or battle zone duties is unlikely for some time ?

*Group III.*—Is there such a degree of disturbance due to breaking down of mental integrity that a clinical picture has crystallized out ?

- (a) Is the clinical picture such as to call for individual rehabilitation by analytical psychotherapy ?
- (b) Is the clinical picture such as to call for largely re-integration into group life rather than individual psychotherapy, i.e. by means of Group Therapy ?
- (c) Is the case of such a nature that the atmosphere of hospital would be detrimental to rehabilitation, i.e. should such a patient be reconditioned in a convalescent depot or in a para-military rehabilitation centre ?

Clinical acumen of a high order arising from long experience of military and general psychiatry is called for in order to deal adequately with this problem of assignment for the required regime and, furthermore, to decide after due psychological study what that assignment should be.

In the first place capacity for rehabilitation to full duty will depend upon two factors : (a) Degree of predisposition ; (b) degree of structuralization of the precipitated neurosis.

Many test situations are now in use to assess predisposition, and this is not the place to deal with so technical a problem of psychiatry, but it can be asserted that from family history and the presence of definable temperamental deviations and previous neurotic breakdown it should be decided whether the man is likely to have a repeated breakdown even if his present neurotic reactions can be alleviated by any of the instruments of psychiatric treatment of an individual kind (narcosis, narco-analysis, hypnosis, and short-term analytic psychotherapy).

Nevertheless, whatever is revealed by individual approaches does not entirely cover the whole of the man's capacity for normal reactions ; his social or group capacities remain to be explored and evaluated. Participation in Army life is, after all, a measure of a man's group capacity. His morale, vested in his enthusiasm, and his emotional ties to others cannot be correctly assessed in the consulting room or at the bedside, and nothing short of observing his interpersonal relations in a military or para-military field of activity will yield the necessary answer. This answer is likely to be obtained through group therapy in the widest meaning of that term.

The chief findings of modern biology indicate that any attempted isolation of the individual from the group, or consideration of the group as independent of the individuals composing it is impossible. Neither psychology nor sociology is an autonomous science.

In short, consideration of a man's capacity for affiliation will be productive not merely of a diagnosis but of a method of drawing out his resources and making use of them for some specific end. This is of the essence of rehabilitation.

How can this be implemented ?

It may be achieved by the technique outlined by Bion and Rickman in which the members of a hospital unit are free to establish their own interpersonal relations and thence their own group discipline and purposes. In such a free regime which produced its own social-military structure, the observer psychiatrist acts merely as a catalytic agent or, better, as a lightning conductor in and through which the potential of the group field becomes stabilized or attains a dynamic equilibrium.

From this, group meetings evolve at which the social situation is from time to time reformed, and at which individual idiosyncrasies are aired and reconstituted in the light of group needs. Here the psychiatrist, as therapist, acts as a balancing organ to an organism which is in need of readjustment, but always in a field of activity which is potentially military inasmuch as the group has an essential goal—namely, participation in a military objective. It is no use for the doctor to be a pure culture psychotherapist. He must, in addition, be himself, army-minded and therefore constantly redirecting the individual minds to a group military goal. This is further implemented by the activities being planned along at least para-military lines with a para-military nomenclature. It will be for the individual doctor to decide how rapidly a given group can be boosted up to this level.

To this extent the doctor must use his skill in selecting his group, that is by refraining to admit into the rehabilitation group the bed-ridden and the not yet integrated case. For this a modified regime can be evolved.

It is for this reason that a " blue group " and " khaki group " came into being in at least one neurotic centre. To what extent this rehabilitation group can exist under the same roof as the blue group (or phase) is a moot point. Nevertheless, it can be submitted that when a section of hospital population (a blue group) has reached a certain level of integration, it can be discharged as a body to the rehabilitation centre. This may entail a period of delay but it is worth some sacrifice of time so that the next phase can be entered without the widespread " contaminate " with the half-ready and the partially willing.

It would be an interesting experiment, with prospects of useful results, if at the end of the first phase, some selection technique by group tests were instituted to arrive at some standard assessment of an individual's preparedness to pass on to the next phase of rehabilitation.

A similar technique can apply to officers. A study of a group of officers has revealed that many have lost their feeling of responsibility and capacity for leadership. Both the technique of the free group formation and the selection test would help in assessing an officer's readiness to assume his role again.

It is suggested that where (as at Northfield Psychiatric Hospital) officers and men are considered under one roof, the technique of the War Office Selection Board for officers become an institution. A military testing officer should be attached who would preside over the test situations and the other ranks be used as material upon which the officer patients could exercise their skill in leadership and the improvization of military and para-military schemes. It is idle to rehabilitate officers in a purely officer field of activity. They are destined, in virtue of their function, to operate with men and their capacities can only be mobilized again if their available resources are given the opportunity for exercise with men. Field activities should be carried out with the men patients at the rehabilitation stage.

#### VII.—HEAD INJURIES.

There are two aspects of the rehabilitation of soldiers with head injuries which call for special attention. The first is strictly neuro-psychiatric, the second largely psychiatric.

(i) It is clear that no one can make the best of his everyday experiences unless the sensory motor apparatus is intact. Analytical neurology has moreover demonstrated that the fields of agnosia and allied disorders are tied up with proprioceptive experience, and furthermore the processes of symbolic thinking as shown in aphasia studies are again tied up with the former. No better illustration of integrative action could be given than from studies of war injuries of the brain, and no better example is available of the high grade requirements of every attempt at rehabilitation in this field.

No man with a head injury can be summarily dismissed to duty, let alone to civil life, without a most careful examination of his capacity for thinking and of environmental analysis.

The easy application of mental tests leads to crude results and shallow insight which does not permit the diagnostician to make accurate recommendations regarding ability to carry out high level linguistic and mechanical tasks. Furthermore, deterioration of intellectual powers could not be assessed by the use of the ordinary batteries of mental tests. For example, it was generally held by both psychiatrist and psychologist at Bangour Head Injury Hospital (Professor Norman Dott) that the Matrix test is not a reliable guide to assessment of intelligence level. Many patients who could only register a "deficiency level" on Matrix came up well on vocabulary tests.

They concluded that these findings cast some doubt on the unitary conception of Intelligence, and rather go to show that capacity to perform the Matrix test is based upon a number of integrated processes while the use of standard tests were of service for the normal range of persons. They may prove misleading in cases of head injury where focal lesions result in the loss of very specialized elements in cognitive behaviour. It became clear to me in watching men both at remedial exercises and in the occupational therapy department that there was much in this contention and that rehabilitation would fall short in its aim and lead to misdirection of men to occupations unless the components of intelligent behaviour were subject to fine analysis and unless paths of compensatory activity were explored in order to make a man useful in new ways and/or by new methods of re-education. It may well be that the neurologists are too conservative and analytic in their approach and that they place the datum line of a man's basic capacity too low. Nevertheless the use made of musical exercises and dancing in the remedial department showed at least an implicit realization of factors that make for recovery. Then the part played by proprioceptive loss in limiting a man's capacity was subject to observation and, from this observation, new integrations were achieved to the advantage of the patient.

(ii) In this department of medicine, perhaps more than in others, the disorders of neurological integrity will be closely bound up with disturbances of personality. Even if disturbances of thalamic function may explain some of the emotional disturbances which run con-

currently with injuries to the cortex, it cannot be denied that the conception of the whole personality, which psychiatry rightly stresses, will help to explain the anxieties felt by head injury victims.

No amount of structural neurology will help us to overcome the psychiatric disturbances which saturate the picture particularly of those with cortical injuries. But here the part played by psychiatry in rehabilitation will be on all fours with its role in general medicine. The neurological aspects of head injuries concern the re-adaptation of men with loss of skill, loss of comprehension and loss of the most subtle endowment of man—speech and language.

That head injuries call for special rehabilitation is obvious, particularly as the complex nature of the disabilities found on neurological analysis must make it difficult to place men in Army life or industry in accordance with their residual skills and their varying degrees of educability.

For this reason it is important that Resettlement Officers should work in very close collaboration with neurologists even, as in Professor Dott's unit, attending case conferences, so that they have a first-hand knowledge of the patient's base-line of capacity. They are thus able, with this information, to relate it to the facilities for training in crafts allied to the man's former occupation and to relate this again with the capacity of the Army and industry to absorb him.

It can be suggested that nothing is more important than that neuro-psychiatrists should visit training establishments in order to watch men in a quasi-industrial setting.

For, after all is said and done, watching a man's achievements in research rooms or in rooms for remedial exercises and occupation gives a mere outline picture compared with what can be learnt by watching a man doing an actual operation in which he sees a profitable goal with all the emotional satisfactions that go with it. In moments of alarm and imperative need, the hemiplegic walks and runs, and the aphasic, too, in crises will produce vocabularies and powers of expression which are rarely seen in the research laboratory.

Here, therefore, is a field for research, where psychiatry, neurology and social welfare can work together to mutual advantage and above all to the advantage of the man for whom such researches are ultimately designed.

### VIII.—OCCUPATIONAL THERAPY.

Occupational therapy has passed through an interesting history since the days when it was purely concerned with diversional exercises employed in order to give patients and convalescents an opportunity to fill the dull hours of the bedridden and the recovering with such work as would distract them from their immediate troubles and prevent unhealthy introspection. At first, diversional work was a stop-gap which allowed the sympathetic public to provide bed games and crafts to wounded men and to enable the physician and surgeon to fill the gaps between treatments.

With the growing appreciation of the need for functional activities to restore usefulness, occupational therapy called in the aid of the craftsman and the artist to provide *suitable* handicrafts and arts. The mere turning of wheels and the knotting of woollen yarn provides little in the way of a goal which shall direct a recovering patient to the use of limbs which are destined to play the central part in a man's ultimate usefulness.

In all orthopaedic and head injury hospitals, an attempt is made to gear these occupations to the scientific procedures designed to aid recovery for vocational ends, and the mere diversional purpose is being gradually and rightly discouraged. It is found that diversions in many early stages of recovery are, as noted above, healthy distracting occupations but they are not purposeful on long term principles.

The nearer a man approaches the horizon of full recovery or such degree of recovery as the lesion allows, the more purposeful it should be, and the more it should approximate to the type of work the man will ultimately be engaged upon whether in the Services or Industry. The following desiderata must be studied in order to incorporate occupational therapy in the total design of Rehabilitation.

- (1) The clinician and the O.T. instructors must collaborate in the grading of such crafts

as will give plasticity to a man's movements: (a) to keep hand, eye and mind working together in an integrative process so that the effects of disuse should be broken down as early as possible; (b) to help the clinician to study the process of recovery in order to see how recovery takes place in a functional situation; (c) to guide the clinician in order that he should be in a position to inform the P.S.O. at a unit, or Industrial Welfare Officers, the degree of usefulness the man has acquired.

(2) Collaboration must also be maintained between O.T. instructors and Physical Training instructors in order that both should compare their observations regarding range of movement, appearance of trick movements, neurotic inhibitions and tendencies to simulate disabilities.

(3) It is desirable that a psychiatric adviser should be available in order to help both O.T. and P.T. instructors to interpret the causes for tardy recovery or loss of interest. At this stage, personality studies become desirable in many cases to ascertain social and familial problems which block the path to a man's ability to mobilize all the available powers which the clinician believes the patient to possess.

(4) Occupational therapy has hitherto been too much confined to the arts and crafts, a bias which has naturally arisen from the large numbers of orthopaedic and purely neurological disabilities which call for training in motor plasticity. It should include educational and cultural activities. In a citizen Army of democracy, men have been torn from the activities which they value. The healthy mind starved of mental food rapidly falls into a state of apathy and thence to depression unless opportunities are afforded to explore the country of the mind, to exercise current ideas or to cultivate those higher values, social, religious and æsthetic, upon which men rightly place such store.

No hospital is complete unless educational facilities are ready to hand. Morale springs from craft pride and craft efficiency; it also arises from a sense of war purposefulness. "A soldier knows what he fights for and loves what he knows." Rob him of this spiritual impulse and he will wilt and all the engines of Occupational Therapy will be of little avail.

This consideration can be extended to include group activities within the hospital. All rehabilitation, particularly in Military Rehabilitation Centres, should be designed with a social end and wherever possible the O.T. workshop should be designed to stimulate co-operative activities in addition to those individual and solitary activities in which some, but not all, men find satisfaction.

#### REFERENCES.

- NICOLL, E. A. (1941). "Rehabilitation of the Injured," *Brit. Med. Journ.*, April, 501-6.  
*Idem.* (1941). *Ibid.*, "Rehabilitation of Injured" (Leading Article).  
 CURRAN, D., and MULLINSON, W. P. (1940). "War-Time Psychiatry and Economy in Manpower," *Lancet*, August, 185-86.  
 JOKL, CLUVER, and DE JONGH. "Training and Efficiency."  
 "Report of late Departmental Committee on Rehabilitation and Resettlement of Disabled Persons," H.M.S.O., 1944.  
 The Organization of a Hospital Rehabilitation Department (E.M.S.). Memorandum 106, 1943.  
 "New Life for the Disabled." *The Times*, May 22, 1944.  
 "Convalescence and Rehabilitation Report 5. Psychological Aspects of Convalescence," U.S.A. Office of Scientific Research, August 15, 1944.  
 MILLER, A. (1942). "Late Rehabilitation of Injured.—Seven Years' Experience of an Industrial Clinic," *Brit. Med. Journ.*, 109-11.  
 CEARAS, A., and GATTEMAN, E. A review of Recent German Work on Gunshot Wounds, Head. (*Bull. of War Medicine*), 3, No. 9.  
 LARGE, S. D. (1943). "Rehabilitation," *Journ. Roy. Army Med. Corps*.  
 GRIFFITHS (1943). "Treatment of Injured Workmen," *Lancet*, 729-33.  
 NICOLL (1943). "Principles of Exercise Therapy," *Brit. Med. Journ.*, 747-800.  
 ROWNTREE (1942). "Rehabilitation and Prehabilitation." *Journ. Amer. Med. Assoc.*, No. 18.  
 BLOOD, HAMOND VERNALD N. "Discussion of Effects of War-Time Industrial Conditions and Mental Health."  
 "Physical Medicine in General Practice." Several Authors. *The Practitioner*. 1938.  
 SHEPHERD, A. (1943). "Rehabilitation and Occupational Therapy," *Brit. Journ. Phys. Med.*, March.  
 MACK, H. E. (1930). "Rehabilitation of the Disabled," *Journ. Amer. Med. Assoc.*, 95.  
 HOWITT, F. D. (1942). "Rehabilitation and the War," *Brit. Sci. Phys. Med.*  
 CAIRNS, A. (1942). "Rehabilitation after Head Injury," *Brit. Journ. Phys. Med.*  
 DUKE-ELDER (LADY) (1942). "Rehabilitation Ophthalmic Cases," *Ibid.*  
 WITTKOWER, E. (1945). "Employment of the Blinded in Industry," *Industrial Welfare*, January (in press).

## PSYCHIATRY IN BURMA.

[Received December 12, 1944.]

A CONFERENCE on Psychiatry in Forward Areas was recently held in Calcutta. A full report was forwarded to the Editor by Brigadier E. A. Bennett, *M.C.*, the Consulting Psychiatrist in India. It is regretted that space does not permit the publication of other than very brief extracts. The ones chosen are chiefly condensed versions and extracts from papers by four Divisional Psychiatrists which give some indication of the conditions under which these officers were working.

The D.D.M.S. of the 14th Army wrote: "Your specialists have been, and are, doing invaluable work, especially in the forward areas, and all formation commanders are most enthusiastic. I trust you will be able to enlarge the scope, especially as regards Indian troops. It would, I feel, be an advantage to have Psychiatrists attached to training divisions and brigades in India, if this is practicable."

Although the extracts which follow deal with Divisional Psychiatry, the conference stressed the importance of selection as a preventive measure.

### PSYCHIATRY IN A DIVISION ON THE BURMA FRONT.

By Captain P. J. R. DAVIS,  
*Royal Army Medical Corps.*

THIS Division attacked Kohima. The fighting was severe, movement was rapid, the weather appalling and casualties heavy.

It was not clear, to begin with, where a Psychiatric Centre would function most efficiently. The psychiatrist began work at the M.D.S. of a Field Ambulance, located on the outskirts of Kohima and casualties were received direct from the R.A.P.s. The noise of battle was so great, however, that it was impossible for the men to rest and relax and the dose of sedative required to give adequate sleep had to be increased beyond what was desirable. Accommodation here was limited and there was difficulty in holding cases for an adequate time. After a brief trial a Psychiatric Centre was set up 18 miles behind the actual front line at Milestone 38 on the Manipur road.

This Centre proved to be ideal. It was in a corrugated iron shed capable of holding 30 to 40 charpoys (string beds). In one of the large rooms a corner was screened off to form a ward of five beds for officers. A small room was used as a reception and consulting room and the nursing staff was accommodated in another small room. Outside were cookhouse, wash-house, latrines and a small recreation room equipped with radio, newspapers and writing material. Three 40-pounder tents were pitched, each capable of holding two stretcher cases. The Centre was adjacent to a Staging Section to which it was originally attached for rations. Eventually the Psychiatrist found it possible to look after his own rationing arrangements.

The patients, on arrival, were given a short preliminary interview, at which their condition was broadly assessed. It was important to determine at once whether the case was one in which physical fatigue was the principal factor or whether emotional causes were mainly responsible, because of the great difference in the dose of sedative required in the two groups. The Psychiatrist kept well in the battle picture and he was therefore able to judge, apart from the patient's own statement, the physical and mental stress to which he had been subjected.

As a routine the patients were next given a substantial meal with as much hot sweet tea as they could be induced to drink. A sedative was then administered, the dose depending on whether the case was considered to be predominantly exhaustive or emotional. The former required only 1 or 2 drachms of paraldehyde, while the latter often needed 5 drachms, initially, followed by 2 drachms one hour later.

Very agitated cases were accommodated, on admission, in the tents where a maximum of quietness was obtainable and where their disturbed state did not react unfavourably on recovering cases and those about to return to duty.

Sleep for a period of twelve to twenty-four hours was aimed at after which the majority showed marked improvement. Next, each man was given a bath and a change of clothes. Stocks of clothing and washing materials were held.

On the third day the soldier was given a long interview and, when necessary, this was followed by simple psychotherapy. Many improved out of all recognition with nothing more than sleep, food, a wash and a change of clothing. Abreaction, under pentothal, was not found to be a particularly useful procedure. Better results were obtained by using simple persuasion, explanation, firm encouragement and suggestion. In addition to psychotherapeutic procedures, the men were supplied with plenty of writing material and books, encouraged to use the recreation room and to listen to the wireless. The need for further resources in the way of material for diversional therapy was felt at times. Carpentry tools, for example, would have given an opportunity for manual activity.

#### RÉSUMÉ OF CASUALTIES FOR A PERIOD OF FIVE WEEKS.

<i>Disposal :</i>							
Returned to Unit..	..	..	..	..	..	..	104
To Hospital ..	..	..	..	..	..	..	26
Recategorized ..	..	..	..	..	..	..	23
Posted to Rear Details ..	..	..	..	..	..	..	10=TOTAL 163
<i>Diagnoses :</i>							
Exhaustion ..	..	..	..	..	..	..	62
Acute anxiety reaction ..	..	..	..	..	..	..	51
Anxiety neurosis ..	..	..	..	..	..	..	38
Hysteria ..	..	..	..	..	..	..	15
N.Y.D. ..	..	..	..	..	..	..	12
Reactive depression ..	..	..	..	..	..	..	3=TOTAL 181

It was very difficult to establish a criterion for judging which cases would relapse. At the time of writing (after three months) 12, i.e. approximately 10 per cent of those returned to their units, had relapsed. Most of them had fought well before breaking down again. Those with depression about the loss of comrades, accompanied by marked emotional instability, usually have a good prognosis and many such quickly returned to the line. The apathetic individual, with little emotional feeling, did not do well. Those of sound personality, who develop acute anxiety conditions, have a good prognosis. The timid, unaggressive individual, of solitary habits, is apt to relapse. He is less tough than the average soldier.

The low rate of psychiatric casualties in this Division is considered to be due to three causes :—

(1) Thorough selective work had been carried out during the training period. (2) There was a high standard of officers and leadership in the Division. (3) The morale of the British soldiers in the Division was high.

#### DIVISIONAL PSYCHIATRY.

By Captain J. W. MILLER,  
*Royal Army Medical Corps.*

THIS Division was fighting in the Imphal area at a time when Japanese infiltration was taking place and consequently operations were "fluid."

Psychiatric casualties were seen under a variety of circumstances. From March to April the Psychiatrist was attached to an Indian Field Ambulance. This unit was located in the March defensive position or "Box." To this "Box" groups of soldiers who had become casualties made their way. The Psychiatrist made a point of seeing all British cases admitted to the Field Ambulance. Owing to the numbers it was difficult to see all the Indian cases.

In the "Box" treatment was carried out at the M.D.S. Cover from shelling was secured by digging in but there was no head cover. A splinter-proof room would have been a great asset, but it was not possible to make this. Consequently, dealing with psychiatric cases was



complex. Nevertheless, more than 50 per cent of cases returned to their units within three days.

When the position was evacuated a well-organized withdrawal in a "March Box" took place. Treatment in this was difficult but not impossible. Sedatives, explanation and rest were the chief measures employed. When the "Box" position was first occupied no one clearly knew the disposition of the troops nor the size of the "Box." There was a good deal of apprehension about the position of the Japanese and considerable nervousness was shown once or twice. The troops soon settled down and put up a remarkably good show.

The number of cases seen was 53—25 were returned to their units in Category "A," 3 in Category "C," and 25 were evacuated.

The following points, amongst others, are noted :—

- (1) It is difficult to hold cases at the M.D.S.
- (2) All units should know the position of the Psychiatrist.
- (3) Classification of admissions quickly into the following categories : (i) Those returnable in same category ; (ii) those requiring prolonged treatment and to be evacuated ; (iii) men unfit for front-line duty but fit in a lower category.

*Treatment.*—In certain instances pentothal was used within the first twenty-four hours. Those selected for its use were apparently well but unwilling to return to duty or to co-operate. Paraldehyde, 4 drachms, morning and night, gradually reducing the dosage as indicated, was most useful. When barbitone-soluble was used, at least 22½ grains were given to begin with. Morphia and hyoscine were found to be of little value with battle casualties. Morphia gr. ½ and hyoscine gr. 1/50 often had little effect.

On the second day psychotherapeutic measures were used, such as superficial analysis, persuasion and suggestion and reassurance. A thorough physical examination was also made.

On the third day, if the patient was doing well, sedation could be reduced to paraldehyde, 1 or 2 drachms, night and morning. Whatever occupation was possible, such as games, reading, digging trenches and constructing dug-in wards, was encouraged.

Heavy sedation was used when evacuating those with a serious breakdown of a psychotic or psychoneurotic nature.

#### PSYCHIATRY IN A DIVISION.

By Captain A. H. WILLIAMS,

*Royal Army Medical Corps.*

THIS Division was in action on the Arakan Front. When the fighting stabilized, the fighting consisted in a series of attacks on defended hill features. Exhaustion, with anxiety, was frequent after each action. These patients responded quickly to rest, sedation, good food and simple reassurance. They were seen at the M.D.S. which was close to our guns. There was also a party of Japanese about 400 yards away. The therapeutic setting consequently was not ideal. Only patients with an obviously good prognosis were retained. They were kept, on an average, for five days and then returned to duty. Gunfire was incessant and the standard of physical comfort was low. From sunset to dawn there was a constant danger of Japanese patrols. Smoking, talking and any movement were forbidden during the night. Patients were made as comfortable as possible and given good food and such other medical comforts as were available. The only sedatives used were medinal and morphia. If a patient did not respond to medinal gr. 15 t.d.s. he was evacuated. There was a shortage of other sedatives as the unit was working on a pack basis.

Amongst the points mentioned are :—

- (1) During the monsoon, malaria increased, and with it was seen a marked rise in toxic psychosis.
- (2) Physical investigations often revealed anæmia, splenic enlargement and infestation with worms. When the physical conditions were remedied, the psychiatric symptoms often faded.
- (3) Morale amongst Indian other ranks depended on good leadership and administration. When the men are well fed, given regular leave and when their religious scruples are respected,

they will do anything and go anywhere. Morale in British other ranks depended on their knowing what they were expected to do, unit *esprit de corps* and sound tactical leadership.

# A NOTE ON PSYCHIATRY IN INDIAN TROOPS.

By Major J. MATAS,

*Royal Canadian Army Medical Corps.*

THE following short extract from a paper on Psychiatry in an Indian Corps by Major Matas, is given. He raises an important point when he refers to the use of the blood sedimentation rate to exclude active organic disease.

*Indian Other Ranks.*—It was noted how frequently physical factors caused or contributed to their psychological symptoms. It was often difficult to make an exact diagnosis as usually they could not be kept long enough at the Corps Centre for the physical illness to be treated.

The I.O.R. is subject to hysteria, commonly in the form of "fits." Under acute stress, gross hysterical symptoms, such as deafness, blindness and tremors, were frequent. In most instances these patients responded to simple suggestive measures while conscious or under the influence of pentothal. The I.O.R. was very difficult to deal with if he developed an anæsthesia or paralysis following a slight wound. Patients who complained of weakness, dizziness, vague aches and pains, and even of psychotic symptoms, often had a physical illness, commonly chronic malaria, amoebic dysentery or hookworm infection. The blood sedimentation rate was done, as a routine, in all cases of doubtful ætiology.

In spite of the larger number of I.O.R.s in this Corps they suffered less, proportionately, than the B.O.R.s from psychoneurotic illness. Psychosis, on the other hand, was commoner. In 7 of the last 11 I.O.R.s admitted as psychotic, toxic factors were found. Suspected S.I.W.s were very much more common in the I.O.R.s than in the B.O.R.s.

Delirium, as a symptom of a toxic psychosis, was rare amongst I.O.R.s. More often the psychosis was of the stuporous type, and the patient was mute, self-absorbed, inactive, indifferent, neglected food and soiled himself. Sometimes a mood of fearfulness, related to the alleged presence of the enemy, appeared in a psychotic setting.

The I.O.R. is liable to short psychotic episodes of the manic-depressive and schizophrenic types. If prolonged, the clinical picture is likely to change rapidly from week to week, e.g. the patient with mild anomalies of behaviour becomes "crazy" in the lay sense of the term, shortly to revert to his former behaviour.

Viceroy Commissioned officers and officers of Indian birth, developed psychoneurosis of the same type and, for the same causes, as the B.O.R. In I.O.R.s it was difficult to assess the level of intelligence except clinically, as tests used on B.O.R.s are unreliable for I.O.R.s and no others were available. In the illiterate I.O.R., such simple tests as remembering six numbers, or counting backwards from 10, were found to be beyond the capacity of even quite the competent sepoy.

To determine the intellectual level of the I.O.R. is less important than with the B.O.R. In the B.O.R. the dull and backward break down in action. In the hardships and dangers of active service he has nothing to support him except a vague desire to do his bit. Sentiments such as patriotism, appreciation of the alternative to winning the war, tradition, and other complex ideas which keep up the morale of the average man, are beyond his grasp. In addition, he has been brought up with one set of ideas which can be summarized as the Christian attitude, and he lacks the capacity to adjust to what is, in many respects, the antithesis of this attitude. The I.O.R., however, is accustomed to a lower standard of living, and he finds the hardships less onerous. In addition, he is living in his own country and can go home periodically, and, most important of all, the I.O.R. infantry soldier comes from a martial race, and being at war requires no re-orientation of attitude.

The Gurkhas, on this front, produced very few cases, either psychotic or psychoneurotic. The average Gurkha starts with better physical health than the I.O.R., is perfectly adapted to fighting and accustomed to the jungle.

## PSYCHIATRY AMONGST WEST AFRICAN TROOPS.

By Captain N. DEMBOVITZ,  
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[Received November 24, 1944.]

### INTRODUCTION.

It is important in psychiatry to know something of the background of the patient. In dealing with West African troops it is essential to have a working knowledge of the social life, habits, beliefs and customs of the tribe from which the patient comes, in order to be able to assess the significance of any unusual behaviour or thought. To the European, fresh from home, many West African ideas are so strange that the difference between the normal and the abnormal is imperceptible ; but every officer serving with a West African unit soon learns a great deal about the nature of his troops and can detect significant variations from the normal.

In a short article it is clearly impossible to describe the characteristics of each of the numerous tribes whose men furnish soldiers for the R.W.A.F.F. There are, however, certain aspects of personality which are common to nearly all West Africans and these will be given later. Of course, there are large variations from the average and special peculiarities in every one of the Negro peoples and due allowance must be made in individual cases. For example, while the average level of intelligence is low, there are large numbers of West African lawyers, judges, doctors and journalists, some of whom compare favourably with their European counterparts.

From a psychiatric, as well as from a physical, cultural or anthropological viewpoint, natives of West Africa may be divided into two great groups. The first compose the Hausas, Fulanis, and Pagan tribes of the Northern Territories of the Gold Coast and Nigeria. The other consists of a large group of linguistically separate tribes inhabiting the coastal areas.

### NORTHERN TERRITORY MEN.

These are tall, dignified and courageous people and make up most of the fighting battalions. They have some Arabic ancestry and the dominant Fulanis and Hausas are Mohammedans, while the indigenous tribes remain pagan. They nearly all speak Hausa. They live in villages or townships under chiefs and they are good farmers, stock raisers, traders and artisans in leather and cloth. The tribesmen have a long tradition of savage warfare and are considered excellent soldiers under British leadership.

Northern Territory men, on the whole, are honest, cheerful and uncomplaining. Both the Muslims and pagans are content with their lot and do not readily learn English or embrace Christianity, for they consider their own language and religion all that is necessary for a good life and a satisfactory death. They seem to be rather less intelligent than the coastal people, but more than compensate for this by an increased willingness to try and a greater pride in being soldiers. They are amenable to discipline and present few special psychiatric problems.

They believe in Juju and in the legend that a man can turn himself into an animal and ravage the country. But they are much less concerned with magic practices than the Southerners.

### THE COAST AFRICANS.

These make up the supply and auxiliary services of the R.W.A.F.F. They come from many different tribes, each with its own culture. The tribes are traditionally at war with each other, and speak mutually incomprehensible languages, so that pidgin English has come to be the lingua franca. There is a vast range of social organizations from the Stone Age onwards, through mediæval feudalism to a little twentieth century industrialism under

British control. The primitive arrangement has been complicated in the past century by the irregular impact of British trade and European religion.

At heart, most of the Coast boys, whether professing Christianity or not, are pagan and the greatest single belief throughout the colonies is the Juju—the conferring of the magic power for good or evil on an inanimate object by a ceremony. It is an unshakable belief for most of the troops and it is therefore not surprising to find it invoked in every mental upset. If a man is depressed, he attributes the illness to the work of an offended Juju who has been insufficiently propitiated. If he runs amok with a matchet, it is because the Juju is inside him; if he becomes deaf, dumb, blind or paralysed, it is because an enemy has put a Juju on him. Even the acquisition of gonorrhœa is laid at the door of an angry Juju.

The folk-lore of the coastal areas is an anthropological gold-mine. Common to all the different legends is an implicit belief in the power of the dead over the living and in the existence of various supernatural and dangerous forms of life in the bush. The Ashanti describe dwarfs whose feet point backwards and who live in the bush under their own kings. These dwarfs may capture one of the local people, keep him for a few days or weeks, and then release him. Even in the popular accounts the wee people do little harm but all the villagers are very frightened of them. The bush in Southern Nigeria is peopled by ghosts. The Gambians see non-existent wolves. It is important to realize that to the Africans these popular bogies are as concrete as themselves and, in spite of European teaching, the belief in their reality is very firmly held.

Life in the coastal regions is simple. Agriculture is carried out by burning down a patch of bush each planting time and leaving the exhausted soil after each harvest. It is an "epoch behind the cow" in many cases. The people are contented and neither seek nor welcome any change. There does exist a movement in the big towns for social progress but it does not appear yet to correspond to the wishes of the population.

Secret societies are common. They range from rather silly mutual benefit associations to serious and powerful anti-social organizations which terrorize the countryside. The notorious Human Leopard Society of Sierra Leone was one of the latter. The existence of such secret societies may explain the extraordinary evidence which the troops sometimes give about each other. A witness belonging to the same brotherhood as the accused will commit incredible perjuries to secure an acquittal. A member of a rival organization will, just as brazenly, testify in an opposite direction.

Cannibalism and human sacrifice were important aspects of Coast life until fairly recently. Although these savage customs are dying out, there are still occasional cases reported. It is of some interest to note that the culprits are frequently not bush villagers but educated townsmen.

Facial scars are visible evidence of the barbarous nature of some West African customs. They are present in the Northern Territory boys as well as in the Southerners.

#### PERSONALITY.

The main differences between the Northerners and the Southerners have already been discussed.

The average uneducated West African at home is a simple, cheerful, unassuming and unambitious fellow, who is content to do a little work and to allow his wives to do as much as they can. He enjoys his food and his sex life. He likes to sing and dance and to spin yarns to the village circle. He has a robust sense of humour and is easily moved to laughter especially on hearing of the misfortune of others.

Although easy-going in most things, he reacts very sharply to any attack upon his rights. The Gold Coaster is an accomplished poisoner but, with the spread of European ideas, he has taken to litigation instead and African professional pleaders flourish.

He is closely tied, emotionally, to his parents and, to a much lesser extent, to his wives. His brothers, either genetic or geographical, are also very close to him.

Nature is to him a terrible force, which must be propitiated, and witch doctors of all sorts are paid and respected and feared. He obeys all the laws of his Juju meticulously and

carries out the appropriate ceremonies without question. He is highly superstitious and will not go into the bush alone at night if he can possibly avoid it.

He is easily excited and readily joins in with any mob that appears. At a fire, for example, he will turn up screaming and jumping with excitement and will be vociferously disappointed if it is out before he gets there. He will join in any dispute that presents itself and will become a protagonist with a fine disregard for the facts of the case.

As a soldier in his own country he delights in his uniform, sings merrily on route marches and organizes his own simple pleasures. His needs are small, and as long as he gets his sleep, his food and his mammi, he is perfectly contented. The educated boy tends to be less contented with his lot than is his untutored fellow, and he is fond of making a parade of his learning, especially in his inaccurate use of high-flown polysyllables.

In India the troops make a reasonable adjustment to a strange land and are no more nostalgic than British troops. They find the absence of their women a problem which they solve as conscience dictates. Their reactions are perhaps a little more acute than they are at home. They become sulky and morose more readily; they pretend not to understand an order more frequently; they laugh less and grumble more; they are more excitable and more easily provoked to a display of anger or violence.

It is obviously unfair to assess the intelligence of Africans on a European basis. Most of them score about 20 in the Raven Matrix Test (S.G.V.), but this is not an appropriate measure of their real intelligence. However, the general impression is that they are about as intelligent as a European boy of 10 years. Their general (unspecialized) intelligence is low but their special intelligence and aptitude for such things as driving, fitting, finding the way and picking up bits of foreign languages is fairly high.

Emotionally, they may be safely compared with schoolboys.

#### MANAGEMENT.

Coming from the setting described, the African must be expected to present a special problem in management. Because he is less intelligent and less stable than the European, he must be handled tactfully. Orders must be made very clear to him and he must not be given too many instructions at the same time. In his desire to please, he may pretend to understand orders which, in fact, he has not grasped at all, and thus annoy or amaze his superior.

Because he resents any trace of unfairness or discrimination to a degree unknown in Europe, he must never be allowed to feel that he is being treated any differently from his fellows, for he is very apt to sulk for days over some imagined slight. He responds very well to flattery of the most naïve sort and a few elementary pep talks do a lot to make him feel a proud fellow. Probably the highest compliment he knows is to be called "a fine, fine soldier."

Verbal abuse he tolerates extremely badly and he never forgives the European who makes a slighting reference to his colour or his legitimacy. His usual response, either stated or implied, is that if he is a stupid man (or whatever he may have been called) then he will behave like one.

If he commits a crime, and is punished for it, he accepts the award in good part and does not bear a grudge. But he is prone to mistake leniency for weakness. Trying an African on a charge is a difficult business because his testimony and that of an African witness is unlikely to be in keeping with the spirit of the oath. Even then an Awarding Officer must find his own solution to this problem; as far as possible a judicial appearance of a square deal must be given.

Contented African troops are quite delightful people, but discontented ones are not only vexatious but also dangerous.

#### MENTAL ILLNESS.

The number of cases of frank mental illness among A.O.R.s is not small, and there is frequently a large psychological factor complicating the picture in physical illness.

*Hysteria* is the hall-mark of psychiatry in Africans. Cases of gross, low grade, hysterical deafness or paralysis are common and hysterical exaggeration and prolongation of symptoms are the rule rather than the exception. For this reason, African patients should be discharged from hospital as soon as possible, for a hospital provides a perfect compendium of symptoms from which the hysteric may choose his own.

Hysterical twilight states, fugues, stupors, fits and excitements are seen in A.O.R.s under arrest and the Ganser syndrome is no longer rare. One feels that the conscious element in all these hysterical conditions is a large one, and the response to psychotherapy, either with or without the use of pentothal hypnosis, is only moderate. Harsh measures are rather less successful than the more orthodox ones, for they succeed in producing only more elaborate symptoms.

Frank malingering in the form of fictitious ulcers, conjunctivitis and aural or urethral discharges sometimes occur.

All other psychiatric conditions must be seen as medallions set upon the basic pattern of hysteria. The hysterical mechanism is so readily employed that conversion symptoms colour not only neurotic depressions and anxiety states but also true psychoses.

*Mental defectives*, as may be expected, are universally hysterical. Tests for mental deficiency in Africans are similar to those in Europeans but special allowance must be made for the absence of educational facilities and the language difficulty. In general, a C.O.'s report that the patient has been unable to master the elements of infantry training is the most significant pointer. An inability to count up to twenty in his own language or to give the name of his unit, or to say in which country he is, will be diagnostic. It will be seen that an A.O.R. is required to be pretty backward before being considered defective for quite dull-witted men can make satisfactory soldiers if properly led.

*Psychopathic personalities* make up a fair number of those who have to be boarded home. Those with antisocial trends are more of a problem than the case of European psychopaths, because they resort to violence more readily and are, of course, much stronger physically. An angry and violently destructive psychopath may require ten big African infantrymen to subdue him and will probably leave his finger or tooth marks on all of them. Psychopathic liars and swindlers are usually educated Coast boys and they should be got rid of as soon as detected before they organize a gang of their own.

*Running amok* is a popularly known form of abnormal behaviour. The picture is one of a man quite suddenly seizing a machet or a tommy-gun or a rifle and rushing around slaying all he meets. These cases usually have a rapid and fatal ending but occasionally one gets to hospital. It would appear that running amok is a symptom common to acute mania, catatonic schizophrenia, epilepsy, acute trypanosomiasis, psychopathic personality and possibly to other conditions such as cerebral malaria also.

Pseudo running amok is seen in excited hysterics. They are always careful not to injure anybody and, when cornered, they go quietly, in sharp distinction to the true berserk who fights to the end.

*Hallucinations* are of much less significance than in Europeans. Normal Africans see and speak to their dead parents. The presence of accusing voices, or terrifying dwarfs, does not necessarily imply a serious mental illness, for they occur in simple depressions and anxiety states and, of course, in hysteria. The prognosis of a psychoneurotic condition is not affected by hallucinations occurring in an otherwise normal consciousness. The hallucinations in schizophrenics are no different from those in neurotics but the presence of affective poverty and thought disorder prevents an error in diagnosis.

*Trypanosomiasis* is the cause of about 10 to 13 per cent of acute mental illnesses. Frequently there are no prodromal symptoms and few, if any, enlarged glands. The diagnosis is made by an examination of the C.S.F. which shows an increase in cells (about 30 to 100 per c.mm., and protein (60 to 100 mgm. per cent). The globulin is increased. Trypanosomes are found in only 4 per cent of cases of the disease, but the increase in cells, protein and globulin is pathognomonic in the absence of a positive W.R. The onset of the disease may

be an acute violent outburst and is usually diagnosed, before lumbar puncture, as acute mania or catatonic schizophrenia. Treatment with tryparsamide (2 grams intravenously every four or five days until 32 grams have been given, as the first course) produces rapid improvement within three or four weeks, but recovery is incomplete. The patient is usually left as a simple withdrawn dement. Because of the frequency of trypanosomiasis a routine lumbar puncture should be performed on every psychotic. The classical picture of sleepiness and fever is rarely seen.

"*Recurrent Confusional State*" is a special condition found in Africans. There is a history of restlessness, confusion, violence and wandering coming on in attacks of about one month's duration at a particular season for each case every year. In the villages the patient is tied to a tree by his friends until his attack is over and he is fit to go back to work. There is no mental deterioration of any sort between the attacks and no known pathology. The Africans know that certain of their comrades "go crazy" each year in January, or at "the time of the rains", or "at the time of the dancing," or "at the time we serve our Juju." The attacks are probably best thought of as hysterical although they do not appear to benefit the patient in any way, and occur in men not otherwise more hysterical than their brothers. No treatment has yet been effective in cutting short these attacks but they cease spontaneously in their natural time. West African troops abroad tend to pass into a Ganser state at the conclusion of their attack.

#### TREATMENT

Early treatment by strong positive suggestion in hysteria is essential. The prognosis rapidly becomes worse with the duration of the symptoms and as the conscious element becomes marked. Although Africans are highly suggestible, they do not respond at all well to ordinary hypnosis or pentothal hypnosis induced by Europeans. The removal of a symptom is usually rapidly followed by the appearance of another. Hysterical deafness is particularly difficult to cure, but blindness often clears up dramatically if the patient has to find his own way to his food.

Simple anxiety states respond well to ordinary reassurance and sedatives. A close watch must, however, be kept for the appearance of conversion symptoms, which all too readily occur in hospital.

In psychoneurotic conditions the precipitating factor is commonly obvious and often trivial. An imagined insult, an undeserved sentence, a loss of money, may each be the sole precipitating factor in an apparently severe condition. If the initial problem can be satisfactorily tackled, the illness clears up dramatically.

The management of psychotics is along the orthodox lines, but a greater degree of restraint is necessary in violent cases. It is essential to have many strong guards available if accidents are to be avoided, for an excited African schizophrenic bears a strong resemblance to a caged wild animal. Drug restraint is moderately effective, but large doses are required. Frequently up to gr. 1 of morphia and gr. 1/25 of hyoscine are necessary to produce sedation. Paraldehyde up to 10 drachms is also useful if the patient can be induced to drink it.

Suicide is very rare, but homicidal attacks by patients with paranoid states, or catatonic schizophrenia, are not uncommon. It should be remembered that "reversion to a more primitive level" means in Africans a reversion to savagery. Special care should, therefore, be taken to ensure that no possible weapon is available to psychotics or is given to them by well-meaning persons.

Occupational therapy produces good results in many quiescent psychotics who also take kindly to squad drill and to marching.

I wish to thank Brigadier E. A. Bennett for permission to forward this article for publication.

[NOTE.—The Ganser Syndrome, or "syndrome of approximate answers," is where the patient gives bizarre replies to questions and performs simple actions clumsily. It has been described in hallucinatory states and in hysterical "pseudo-dementia."—ED.]

## WAR OFFICE SELECTION BOARDS AND THE ROLE OF THE PSYCHIATRIST IN THEM.

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### INTRODUCTION.

IN 1941 Army Psychiatrists were asked to undertake experiments in Officer Selection. At that time the Army required a large number of officers quickly and, since very few of the possible candidates had had experience of battle conditions, the test of battle was not available. Further, it was beginning to be felt that the existing method of selection by interview had serious limitations and in particular did not appear satisfactory to the rank and file of the Army. Evidence of the inadequate selection was found in the high rejection rates at O.C.T.U.s which resulted in a serious wastage in training and this large proportion of failures naturally had an adverse effect on the morale of training units.

Psychiatrists were called in because in the course of their work they had accumulated a considerable amount of knowledge of the Army and its personnel problems. They had had to deal with breakdowns in officers and their training and experience enabled them to understand the causal factors which were operating. It seemed likely, therefore, that psychiatric examination of candidates for commissions would reveal a good proportion of those who would be likely to fail in their training or service for one reason or another. In addition, Psychiatrists were concerned in their work with the potentialities and modes of adjustment of individuals. This gave them an advantage in facing the problems of predicting how an individual would perform when placed in a different field of work or in a different level of responsibility in the same field.

The first experiment to verify these assumptions was carried out on groups of officers attending a Company Commanders' School. The results showed that Psychiatrists, on the basis of interview and intelligence tests, made judgments on the quality of officers in close agreement with the opinions reached by the staff of the School at the end of the five weeks' course. The experience gained in this experiment made it clear that the best selection procedure would be, obtained by forming a Board which combined experienced regimental officers with technical experts, i.e. Psychiatrists and Psychologists. An experimental Board was set up on these lines and within a few months an acceptable procedure had been evolved. W.O.S.B.s which followed the pattern of the experimental Board were then set up throughout the country.

### CONSTITUTION OF A W.O.S.B.

Each board consists of the following members: President (Colonel), Deputy President (Lieutenant-Colonel), Senior Military Testing Officer (Major), and three Military Testing Officers (Captains) who form the military side; Specialist Psychiatrist (Major, R.A.M.C.) and Psychologist (Captain or Lieutenant assisted by Serjeant Testers) who form the technical department.

### OUTLINE OF PROCEDURE.

The candidates arrive at the W.O.S.B.s in groups of 30 to 50 twice a week and each group remains for three days at the Board. The whole atmosphere is informal so that candidates will feel at ease. They live in a hostel and are brought into close contact with the members of the Board, especially with the Military Testing Officers (M.T.O.s) who Mess with them. On the first day each candidate completes two questionnaires about himself, does a battery of



three general intelligence tests and three tests designed to give information about his personality. (The nature of these tests is discussed more fully in a later section.)

The candidates are then divided into groups of 8 to 10, each group being in the charge of an M.T.O. who is responsible for briefing the candidates in the various tests and for forming a judgment on each of them on the basis of their performance throughout the course of the Board. The tests administered by the M.T.O. are carried out on the second and third day and are designed to find out whether the candidate's basic personality does or does not fit him for the main roles which an officer has to play. The essence of the junior officer's job under war conditions is that he has to cope both with persons and with "things" at the same time and frequently under stress. The M.T.O. has to find out whether the candidate's basic personality is such that he shows promise of being able to deal effectively with concrete situations. To do this the candidate must have good adaptability to persons, i.e. good "interpersonal relations," and also good adaptability to things, i.e. ability to appreciate a concrete situation and resourcefulness in dealing with a constantly varying material environment. The "military" tests are designed to elucidate these problems. There are three main types of test : (i) Leaderless Groups ; (ii) Practical Individual Situations ; (iii) Command Situations.

No special military knowledge is required for any of them. In (i) the group is left to its own devices in coping with situations which are set by the M.T.O. or by the candidates themselves. These tests enable the observers to gain a picture of the candidate's spontaneous behaviour in a group setting. They form a continuous series which is usually witnessed by a team of three observers, half the candidates being observed by the President, Psychiatrist and the M.T.O. of the particular group and the other half by the Deputy President, Psychologist and the appropriate M.T.O. In (ii) the candidate's practical abilities are tested by making him do some tests using only his own physical resources, e.g. obstacle courses. Alternatively he may have to look about for tools and equipment in order to improvise a solution to some practical problem. Valuable information is obtained by discussing with the candidate the reasons why he performed in a particular way. In (iii) the M.T.O. puts the candidate specifically in charge of his group while carrying out some assigned task. Throughout the M.T.O. makes notes of certain objective facts about each candidate's performance and also records his subjective impressions, i.e. his interpretations of his performance.

During the second and third days interviews are also carried out, half the candidates being interviewed by the President and half by the Deputy President. In addition a certain number are selected, as explained later, for interview by the Psychiatrist. At the end of the testing period the final Board Conference is held with all members of the Board present. Each candidate is discussed and a decision reached on whether he should pass or fail, and, if he passes, for which arm he is likely to be most suitable.

#### THE ROLE OF THE PSYCHIATRIST.

The role of the Psychiatrist in the W.O.S.B.s is a twofold one. As the senior officer of the technical department he advises the Board on the assets and liabilities of candidates. There are two groups of candidates in whom this advice is particularly valuable, those who might be overlooked because of some superficial handicap, e.g. undue reserve, which observes, the fact that basically they are sound, well integrated and quite capable of succeeding as officers, and those who might be passed on a superficial good impression although, on account of certain personality features or low intelligence, they are unlikely to make useful officers. His second main function is to give expert advice on the psychological aspects of the military tests and it may be noted that many of the military tests now used are based on suggestions made by Psychiatrists.

#### PSYCHIATRIC ASSESSMENT.

There are three possible sources of information which contribute to the psychiatric assessment of any candidate. These are : (1) Written test data ; (2) observation of candidates in military tests ; (3) psychiatric interview.

(1) *Written Test Data*.—This can be divided into three types :—

(a) *Questionnaires* : Each candidate completes a questionnaire concerned with the facts of his military training, occupation, education and social activities. This is also available to the President for his interviews. A second questionnaire giving facts about his medical and family history is marked confidential and is completed for the use of the Technical Department only.

(b) *Intelligence Tests* : These are three in number and consist of a special version of the "Matrix" test devised for officer candidates, a verbal intelligence test and a reasoning test. Standards of performance have been established on these tests and according to the scores on them each candidate is given an Officer Intelligence Rating (O.I.R.) ranging from 0 to 10. A rating of 1 corresponds to an intelligence about the level of the ordinary private soldier while a rating of 7 is equivalent to that of the average officer.

(c) "*Personality*" Tests : There is no test which gives a complete assessment of personality but certain written tests can give some indication of the dominant trends which are present. The tests used for the purpose are :—

(i) *Self Description*.—Here the candidate has to write in fifteen minutes a description of himself firstly as a good friend and secondly as a strong critic would do it.

(ii) *Word Association Test*.—The candidate is shown a series of words at brief intervals. He has to write down a statement describing what each word calls up to his mind.

(iii) *Thematic Apperception Test*.—A series of pictures is projected on to a screen. Each depicts human figures with ambiguous expressions and the candidate has to write a short story about each for which the picture could act as an illustration. The themes which he chooses are normally related to his own dominant attitudes and experience.

From the results of these written tests the Psychological staff construct what is termed a "Personality Pointer," i.e. a short statement of what appear to be the main features in the candidate's personality. As the name implies these pointers are merely indications of certain trends in the personality and are in no sense a final estimate of it. They serve a useful purpose in separating the candidates according to the need for further investigation by psychiatric interview. In addition they may help to shorten the interview by indicating the particular aspects of personality upon which attention has to be concentrated.

(2) *Observation of Candidates in Military Tests*.—The Psychiatrist obtains valuable information about the candidates by acting as an observer at some of the military tests, particularly the leaderless group series. Interchange of views among the observers in each team enables each one to build up a clearer and more accurate picture of the candidate's performance than would have been possible with a single observer. It also enables discrepancies in judgment to be brought to light, helps to determine the particular aspects of each candidate which require special attention and helps to select those cases which require psychiatric interview.

(3) *Psychiatric Interview*.—Originally all candidates were interviewed by the Psychiatrist but, owing to pressure of work, it was necessary to alter this so that now he interviews those in whom his opinion is likely to be of most assistance to the Board. This group is made up of the candidates who fall into the "doubtful" group on the pointers and those who are selected by the observer teams at the leaderless group series. In addition certain candidates may be referred by the President on the basis of what he has found in his interview. It may be said, therefore, that the Psychiatrist interviews all candidates except those who are regarded unanimously by the members of the Board as clear-cut "passes" or clear-cut "failures."

The object of the interview is to enable the Psychiatrist to form an assessment of the candidate's personality. The reason why the Psychiatrist is in a position to do this is that he has been trained to observe and assess human beings objectively. He is, of course, subject to prejudice but his training should have made him aware of his prejudices and enabled him to discount them. He is able, therefore, to concentrate on the candidate's basic qualities

and is not likely to be put off by an unfortunate manner or an awkward exterior. Secondly, through his training and experience he has gained a knowledge of certain types of character which he has learned to recognize and whose prognosis he knows, e.g. the "anxious and worrying," the "schizoid," the "hypomanic," the "obsessive self driver," etc. Within each type the degree to which the particular features identifying the type are present varies widely and the Psychiatrist is the only person in a position to assess the significance of these features in any individual case in terms of the likelihood of the individual standing up to stress or the danger of neurotic symptoms developing. In other words, his clinical experience enables him to recognize "danger signals" which would escape the untrained observer. Finally, interviewing has formed an important part of his professional career and the training which he has had in the art of interviewing enables him to obtain more information about a man's basic character than is possible for the ordinary interviewer.

In conducting his interview the Psychiatrist must gain the confidence of the candidate as quickly as possible so that the latter may express himself frankly. He is helped in this by his position as a medical officer which establishes him in the candidate's mind as an impartial but sympathetically disposed person. Once the proper relationship has been established, the interview proceeds spontaneously and most candidates welcome the opportunity of talking about themselves and their problems.

By the end of his interview the Psychiatrist has amassed a considerable amount of information about the candidate—what his background is, how he has developed and how he has dealt with the difficulties in life which he has encountered so far. With this information plus the "pointer" material he is now in a position to form a judgment on the structure of the candidate's basic personality and to offer a reasonable prediction on the likelihood of the candidate's success as an officer, i.e. how far he is likely to carry out effectively the officer role. He forms his opinion after balancing the strengths and weaknesses which he has detected and presents this opinion to the Board in the form of a report explaining why the candidate should be accepted or rejected. This report is considered by the President at the final Board Conference along with the M.T.O.'s report and, in the light of these and of his own findings about the candidate, the President decides whether the candidate should pass and if so with what grade, whether he should fail, or whether he should be put back for further training to appear again before a Board after a suitable interval. In the case of candidates whom he has not interviewed, the Psychiatrist may present a report based on interpretation of the "pointer" material and upon what has been observed in some of the military tests. This report cannot of course be so complete as the kind he makes after interview but since there is, as a rule, little doubt about the candidates who are not interviewed, this is not a serious drawback.

#### DEVELOPMENTS.

What has been said so far applies to the selection of candidates for commissions. But W.O.S.B.s have gradually undertaken other kinds of work for which appropriate procedures had to be developed. In the developing and operating of these procedures, Psychiatrists have played an important part. Examples which may be given include the assessment of officers upon whom adverse reports have been made, the selection of schoolboys for short University courses with a view to their receiving basic technical education prior to their being trained for commissions in certain specified arms, and the interviewing of officers who have been treated in psychiatric hospitals to ensure that they are given the type of employment in the Army for which they are best suited. These are only a few examples but they illustrate the range of technical developments which have taken place. All these developments have this in common—that they aim at ensuring that each man should as far as possible be given a job in keeping with his personality and ability. The experience of Psychiatrists makes them only too familiar with the difficulties and dangers arising from neglect of this principle and it is this same experience which makes the work of Psychiatrists in the selection field so valuable.

## PSYCHOLOGICAL ASPECTS OF THE PROBLEM OF ANTI-MALARIAL PRECAUTIONS.<sup>1</sup>

By Lieutenant-Colonel S. A. MacKEITH,  
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*Adviser in Psychiatry, A.F.H.Q.*

PSYCHIATRISTS are interested in many aspects of malaria. Our most obvious concern is with the gross psychiatric disturbances which may occur in association with the disease. These are various, and none of them is specific to malaria. There are toxic confusional syndromes which occur during the acute stages, schizophrenic psychoses precipitated by malaria which show themselves when the patients return to duty, depressive states with irritability occurring after repeated attacks, and so on.

Psychiatrists are also interested in the highly controversial question of whether certain states of mind predispose men to catch malaria. And finally we are much concerned with certain psychological aspects of the problem of personal anti-malarial precautions.

As soon as the authorities have decided what system of precautions is most efficient, economical and practical, the question arises of how best to ensure that these precautions are taken by all the men all the time. There are four methods of approach at our disposal, viz. :—

<b>DISCIPLINE</b>	<b>HABIT</b>	<b>EXAMPLE</b>	<b>PERSUASION</b>
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All four methods are essential; they are interdependent. Let us briefly examine each in turn :—

*Discipline.*—Since all of us are human and liable to get slack or careless at times (especially when we are tired, frightened, worried, or “browed off”), it is essential to make full use of discipline. By this we mean drawing-up a rigid system of definite instructions, expressing them in clear and simple terms, publishing them verbally and in orders, constant supervision of their observance, and punishment of those who do not observe them.

The soldier is, of course, accustomed to disciplinary methods, and by his training “conditioned” to accept them without rancour. It is primarily by such methods that he is given all his military training, offensive and defensive; and we want personal anti-malarial precautions to be associated in his mind with his general training.

But discipline, in the narrow sense, is not enough. Supervision can never be complete and under forward area conditions is often interfered with considerably. We must, therefore, make full use of habit and example.

*Habit.*—This factor needs no explanation, but it *does* need emphasis. It is of special importance when men are tired or “browed off”; the more fixed the habit is, the less mental effort is required.

The principles of habituation are well known. We can all understand, for instance, that it is easier to teach men to take mepacrine every day than it is to get them to take it regularly four times a week or six times a week. It is helpful if the mepacrine taking can be done at the same time every day, and done, if possible, in association with some other important daily military duty.

*Example.*—From the findings of recent investigations, it seems that this factor, too, needs emphasis. It is of primary importance that all officers and N.C.O.s shall themselves take their mepacrine regularly—and be *known* to do so. It is desirable that at least one officer should attend the mepacrine parade in person and publicly take his own mepacrine there.

Irresponsible criticism of mepacrine taking, even in the “privacy” of the officers’ Mess, should be dealt with firmly by the Commanding Officer and M.O. Officers should be made to realize that persistence in criticism of this sort is really a kind of “fifth column” activity!

*Persuasion.*—Last—but not least—we must by various forms of persuasion reinforce

<sup>1</sup> Notes of a talk given on February 13, 1944, at the A.F.H.Q. Malaria School.

the effects of discipline, habit and example. The methods employable are various; they include lectures, pamphlets, posters, placards, newspaper articles, etc.

Anti-malarial precautions are various and rather a nuisance. The soldier will be helped to remember them if he is given some idea of their rationale. A few words about the history of the discovery of the causation of malaria, and one or two examples of its military importance in the past, may serve to kindle real interest in the subject.

When discussing mosquitoes and their habits and habitats the lecturer should of course be brief and very simple, avoiding all technical jargon. It is better to give the essentials and "get them across" by repetition rather than to attempt a detailed description and leave in the minds of the listeners only a vague impression.

In lectures, pamphlets and posters it is important that we should not be negative only, telling the soldier what he should *not* do. We must try to be as *positive* as possible, clearly instructing him in what he should do and giving him some idea of the reasons why.

In what we say to him, we must never lie or exaggerate, however good our intentions may be. We must not over-emphasize the danger of death from malaria. "Take Mepacrine or Die" is an over-statement, as the soldier will soon discover, and when he *does* discover, he will lose faith in all our advice. In any case the fear argument is a double-edged weapon.

Similarly, we must never say or imply that the regular taking of mepacrine *always* prevents malaria; here again we shall soon be found out. Nor should we deny the occurrence in the past of minor toxic symptoms due to mepacrine taking. It is more honest (and more effective) to admit them and to explain them as probably due to the insufficiently gradual exhibition of the drug.

A few minutes for questions and discussion at the end of a malaria lecture are often well-invested. They afford an opportunity of dealing frankly and patiently both with reasonable criticisms about toxic symptoms, etc., and with irrational doubts, such as the fear that mepacrine diminishes sexual potency. This last belief, though it may seem patently absurd, is by no means uncommon; it should be met with a calm denial—not with ridicule.

The efficacy of posters and placards in anti-malarial propaganda has probably been over-estimated. In so far as we *do* use them, we must adopt an organized plan of campaign. It is no good covering barrack rooms and the countryside with a bewildering assortment of heterogeneous notices of varying standards and types of humour. We must take a leaf out of the book of the professional organizers of advertising campaigns.

What do they do when they wish to encourage the public to drink more beer or eat more chocolate? They observe two fundamental principles:

(a) *Symbolization*.—For the main thing they want to "put across," they adopt a constant symbol. This, whether it be a glass of beer or a mosquito, should in all posters be drawn in the same way, so as to be easily recognizable. Our mosquitoes, or what you will, must not in different posters be drawn from different angles and to different scales.

(b) *Appeal to the Emotions*.—Having fixed his "symbol" in the mind of the public, the advertising expert does not waste much effort in rational arguments about the exact nutritional value of his product or its cost. He either contents himself with the reiterated statement that it is "Good for You," or, more frequently, he appeals directly to our simple emotions such as our desire to be strong, to attract the opposite sex, to be rich, etc.

In dealing with soldiers, we too must appeal to simple emotions and with equal directness. The emotions on which we may legitimately and effectively play include the soldier's pride in his efficiency as a soldier, his loyalty to his mates and to his unit, his desire to win the war, his wish to win it soon and get home all the quicker, his desire to return home at least as fit as he was when he left it, etc. Ridicule and contempt may be directed against a symbolic "Private Cuthbert Careless" who is slack in his anti-malarial precautions; conversely, the regular mepacrine taker should always be depicted as a smart and healthy soldier.

There are two general points to remember. Every poster should aim at "putting across" one point of view only—it is a mistake for a poster to contain too many words or ideas. And an ounce of implication is worth a pound of statement; to say "Mepacrine is as important as Ammunition" is much less effective than to say "Praise the Lord—and pass the Mepacrine!"

## **Editorial.**

### PSYCHIATRY.

THE increasing realization of the importance of Psychiatry justifies the publication of a number of the *Journal* mainly devoted to that subject.

Both Army Psychiatry and Army Psychiatrists have been the targets of much criticism. Much of this has been ill-informed and prejudiced but some outspoken critics have subsequently recanted and made a confession of their conversion. A certain amount of justifiable criticism from experienced critics was constructive. All this was only to be expected as, hitherto, the study of Psychiatry in its relationship to the problems of everyday life has been limited, in the main, to the eclectic few.

This is widely recognized and a Joint Committee of The Royal College of Physicians, The British Medical Association's Group of Practitioners of Psychological Medicine and The Royal Medico-Psychological Association have recommended, *inter alia*, that, "Medical Students should be taught a suitable Psychology in the Intermediate Stage as well as the Principles of Psychological Medicine in the Final Course." The report of this Committee strongly stresses the intimate connexion between Psychological Medicine and General Medicine and Surgery.

One early, and possibly valid, criticism was that many Army Psychiatrists were young and inexperienced both in Life and their special subject. This has been admitted by one who felt that he was "at least ten years too young."

After five years of war is this point of view now tenable? The younger Psychiatrists have learned more of Life, and of Death, than would have been possible in many years of comparative sheltered civilian existence in peace. They have seen men under the severest psychological and physical stresses and, in many cases, have shared such experiences. One lost his life when his unit was over-run by the Japanese.

It is agreed that, once the Army takes the Field, the Psychiatrist does his most valuable work as near the front as is possible.

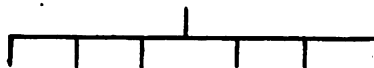
It was early recognized that prevention was better than cure, so selection came into being. Both in officer and in other rank selection our Psychiatrists play an important part. The scope for future research in principles and methods of selection is immense.

Another urgent field for research lies in the relationship between physical illness and mental illness especially, in view of our future commitments, in tropical diseases. Why should certain tropical diseases appear to be associated with certain types of psychological disturbances? Present evidence seems to suggest these are apart from, although maybe conditioned by, the personality reaction of the particular individual. We find malaria associated with protean types of mental states. Sandfly fever is traditionally followed by a pure depression. Bacillary dysentery is frequently associated with an anxiety state. The sprue patient develops an obsessional state. The first sign of heat exhaustion may be a mental irritability and confusion. Why is anti-rabic treatment so often followed by an acute depression occasionally suicidal? We know that there may be an actual myelitis. Is the mental depression the result of organic changes or is it purely psychological with the fear of

rabies in the background? Recently writers have called attention to the mental reactions in trypanosomiasis.

All this opens up a great field for research by Psychiatrists, Physicians and Pathologists working in close liaison.

The future success of Psychiatry is dependent upon an intimate and harmonious relationship with other branches of Medicine as well as with the other branches of the Service. It is quite impossible to have watertight compartments. All too often this relationship may be represented diagrammatically as :—



instead of as :—



The realization of *mens sana in corpore sano* can be realized only by co-operation.



## *Clinical and Other Notes.*

### THE SOLDIER'S HEALTH OVERSEAS.—A YEAR'S STATISTICS.

By Captain E. GREY TURNER, M.A., M.R.C.S.

*Royal Army Medical Corps.*

[Received June 19, 1944.]

THIS is the record of a year's health in an infantry battalion overseas. The battalion landed at Algiers in November, 1942, arrived at the Tunisian front on December 6, and first met the Germans on the 11th. Thereafter it remained in the line practically without interruption until the conclusion of the campaign five months later, fighting on every front and in every type of country. The battalion then took part in the expeditions to Pantelleria, and Lampedusa, after which the rest of the year was spent in reserve.

The year under review commenced on January 15, 1943, the date from which accurate records were once more kept after an interruption due to the early battles and to the loss of the Sick Book in transit to Tunisia (massive losses and thefts of kit at the Bases were distressing features of the early part of the campaign).

The strength of the battalion varied from 650 to 1,000, averaging 800 (including 35 officers). No claim is made that these statistics are free from inaccuracies. It is very difficult to keep exact records under battle conditions but, wherever a doubt has arisen, the higher figure has been chosen so that at least the statistics cannot be accused of flattery. Battle casualties are of course excluded; the figures relate only to sickness.

A good picture of the state of health of a battalion can be obtained from the following three data: (i) the number of new cases reporting sick; (ii) the number of men excused duty (i.e. marked "attend B," "attend C," or "Hospital"); and (iii) the number of men evacuated to hospital.

Daily averages of these figures for each lunar month are set out in Table I. The Index is an attempt to provide a single convenient indication of the general level of sickness. It is merely the sum of the other three figures divided by ten to the nearest whole number.

TABLE I.—DAILY AVERAGES PER 1,000 MEN.

Month.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Mean
New cases..	10	9	10	8	11	10	8	7	11	10	9	7	5	9
Excused duty ..	8	5	6	4	14	17	15	12	18	27	31	26	22	16
Evacuated to hospital ..	2	2	2	1	3	1	1	1	2	3	3	2	2	2
Index ..	2	2	2	1	3	3	2	2	3	4	4	4	3	3

It will be seen that the new cases averaged 1 per cent of the battalion. In addition an average of 2 per cent reported daily at the R.A.P. (Regimental Aid Post) for inspection and treatment. There was therefore a total daily attendance for all purposes of 3 per cent.

Climatically the year fell into two well-defined halves; the cold and wet season (mid-November to mid-May) in which even snow was encountered; and the dry scorching summer. The period when the battalion was fighting (January-May) can also be distinguished from the rest of the year. Averages for these different periods are tabulated in Table II. They show that the battalion (mainly North-countrymen) stood up to the winter rather better than to the hot season and that sickness was rather lower during the fighting months.

TABLE II.—DAILY AVERAGES PER 1,000 MEN.

	Cold season	Hot season	Non-fighting cold months	Fighting months	Non-fighting months
New cases..	8	9	6	9	9
Excused duty ..	12	19	24	6	20
Evacuated to hospital ..	2	2	2	2	2
Index ..	2	3	3	2	3



This relatively low sickness rate during active operations is no new observation. The following explanations are suggested:—(i) Under battle conditions wounded men (who might otherwise have fallen sick) are continually being replaced by healthy reinforcements. The unit receives repeated blood transfusions as it were.

(ii) Under battle conditions the medical officer keeps down to a minimum the number of men excused duty.

(iii) Most important of all, under battle conditions the soldier has less time to think of his ailments and moreover makes every effort to carry on. (An insignificant minority of course take the opposite view, regarding sickness as a heaven-sent avenue of escape from unpleasant responsibilities.)

Table III shows the relative incidence of sickness in the different companies throughout the year. The rate is approximately the same in all, Headquarter and Support Companies together being more than double the size of a rifle company.

TABLE III.

						Percentages		
						New cases	Excused duty	Mean
Headquarter and Support Companies	..	..	..	..	..	39	36	37.5
No. 1 Company	..	..	..	..	..	16	17	16.5
No. 2 Company	..	..	..	..	..	15	16	15.5
No. 3 Company	..	..	..	..	..	15	17	16
No. 4 Company	..	..	..	..	..	15	14	14.5

The relative incidence of different ailments is interesting. Ailments are classified as: Dental (including gingivitis, which was much less common than in the U.K.). Alimentary (mainly diarrhoea). Traumatic (from which war wounds are of course excluded). Skin (this includes boils, carbuncles, infected cuts and whitlow); and Remainder (which includes coughs, colds and sore throats).

This may strike many readers as a curious classification. It was inherited from my distinguished predecessor, Captain C. P. Blacker, and it is a good practical classification for a body of comparatively fit men. (This year a modification is in use, namely, alimentary, traumatic, skin, I.A.T., respiratory and remainder.)

Table IV shows the proportions of the different groups during the main periods of the year. It will be seen that diarrhoea is much commoner in the hot season (when flies are pestilential) and that traumatic conditions are commoner during active operations. All this is to be expected. The average for the year illustrates the high incidence of septic scratches, sores, boils and skin infections of all kinds, which were easily the principal scourge. This must be attributed to the impossibility of keeping clean on active service and (in summer) to the effect of the African sun upon the skins of fair-haired, blue-eyed individuals, of whom there were a majority in the unit.

TABLE IV.

Percentages								
			Cold season	Hot season	Non-fighting cold months	Fighting months	Non-fighting months	Whole year
Dental ..	..	..	5	7	3	7	6	6
Alimentary ..	..	..	9	23	6	12	19	17
Traumatic ..	..	..	16	11	12	18	11	13
Skin ..	..	..	32	23	32	31	25	27
Remainder ..	..	..	38	36	47	32	39	37

The incidence of various important diseases is recorded in Table V. There were no cases of smallpox, enteric fever, tetanus or typhus (although these diseases are endemic in the civilian population of North Africa) because the battalion was protected against them by inoculation. The cases of diphtheria occurred in a small epidemic in which the disease was fortunately very mild.

The high incidence of infective hepatitis amongst officers is remarkable. Of the numerous explanations put forward two appear more convincing than the rest:—

(i) Except under battle conditions officers sleep in pyjamas, and may catch cold while

dressing and undressing. Chilling of the abdomen is a definite danger in Africa (it is an important factor in causing diarrhoea) and it is a pity that British troops are not issued with body belts as were the Germans and Italians.

(ii) Again, apart from active operations, officers feed together in a Mess and use communal utensils. This is probably much more important than (i).

TABLE V.—CASES PER 1,000 MEN PER ANNUM

Diphtheria	..	..	..	..	..	..	..	13
Dysentery	..	..	..	..	..	..	..	18
Infective Hepatitis	..	..	..	..	..	..	..	53 (includes 12 officers)
Malaria	..	..	..	..	..	..	..	35
Venereal Diseases	..	..	..	..	..	..	..	13

In the hot season bursitis, conjunctivitis and balanitis were common and, when sea-bathing was possible, there were many cases of otitis externa.

Among comparative rarities there were two cases of erythema multiforme and one case each of the following: battledress dermatitis, angioneurotic oedema (sensitivity to opium), heat-cramps, surgical emphysema of the eyelids of the right eye (after boxing), osteochondritis dissecans and spondylitis ankylopoietica. The highest temperature recorded in the R.A.P. was 105° F., in a case of malignant tertian malaria.

This account is submitted in the hope that similar units, perhaps in the other Services, will send their figures for comparison.

Acknowledgments are due to Colonel J. C. Barnetson and Lieutenant-Colonel H. R. Norman for permission to forward this article.

## THE CORRELATION OF MEDICAL SCIENCE AND PHYSICAL EDUCATION.<sup>1</sup>

By Brigadier F. D. Howitt, C.V.O., M.A., M.D., F.R.C.P.

[Received November 29, 1944.]

AFTER pointing out that in Ancient Greece intellectual, spiritual, and physical culture went hand in hand, that athletics were intimately associated with the Arts, and that the ideal of the cultured citizen-soldier-athlete died with the Greeks, the lecturer said that since those times many efforts had been made by many countries on a national scale to improve physical welfare, but the motive had usually been immediate and objective and often undertaken for purely military purposes. One had only to cite the instances of Rome, Germany, and Japan.

In our own country the urge had not been lacking, but it had usually lacked Government assistance. From time to time isolated organizations—often voluntary—had appeared and struggled in a parochial way to promote physical fitness. They had usually lacked Government support and co-operation from the different sections of the community interested in the wider problems. In such circumstances their outlook tended to become narrow, their design sometimes faddish, and, like Herrick's daffodils, they tended to "haste away too soon."

It was urged that there was, therefore, a great need to bring together all those services without whose combined interest success was unattainable.

He suggested that medicine had placed too much emphasis on the cure of disease and too little on preventing it; education had placed too great an emphasis on academic and too little on physical distinction; industry, with the exception of certain large and enlightened firms, had failed to appreciate that the health of its employees was an asset and that ill-health yielded a poor economic return; and organizers of sport had been prone to cater for the

<sup>1</sup> From a Lecture delivered at the Royal Institute of Public Health and Hygiene, 28, Portland Place, London, W.1, on Wednesday, November 22, at 3.30 p.m. Mr. Percival P. Cole, M.B., Ch.B., F.R.C.S., in the Chair.

expert, disregarding the needs of the less gifted exponent—hence the adulation of the professional and the tendency of people in general to spend their leisure hours in watching contests rather than in taking part in them.

The lecturer continued: "Such was the position in this country before the war. Characteristically, the Englishman never sees the blow that is levelled at him until it has almost reached his nose, but at that moment he sees it more clearly than anybody else. The strides which we have made in the fields of physical development, rehabilitation, and re-vocation in order to meet a national emergency are very considerable, and have placed this country for the moment in a position of respect. This success has been achieved by the pooling of knowledge of those interested from widely different angles—in other words by team work."

### ABREACTIVE TECHNIQUES—ETHER.

By Major H. A. PALMER,  
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[Received August 25, 1944.]

PSYCHO-ANALYSIS first came into being as the result of Freud's observation that the recovery of the memory of incidents which had apparently been forgotten, in the case of one of his patients, appeared to result in benefit to the patient.

Although extremely little is known concerning the physiology of the higher central nervous system, psychiatrists have speculated as to the beneficial effect of the emotional catharsis resulting from this process of recovery of "repressed" memories.

A further step in this therapeutic attack on buried memories and their attendant emotion was made when their recovery was achieved under intravenous barbiturate narcosis, a technique known as "Narco-analysis."

In handling acute war neuroses it frequently appeared that the patient made considerable improvement following the recovery of amnesic material under both hypnosis and narco-analysis but the methods were time-consuming and it now appears that ether administration achieves similar results.

It is important to consider the possibility that treatment by hypnosis, treatment under intravenous barbiturate administration and treatment by the method presently to be described are not altogether similar in the processes involved.

The technique is as follows: A typical instance would be that of a patient who is complaining of headaches, insomnia, mild depression and general feelings of tension-anxiety, who has returned from the front line as a battle casualty. He appears scared, tremulous and torpid. The patient may or may not recall spontaneously that his symptoms date from being "blown up." On inquiry the history is somewhat as follows: He may or may not have been aware of a gradual oncoming loss of grip and there may or may not have been immediate antecedent circumstances, such as the death of a close comrade, bad news from home, or a "near miss." The patient frequently describes having felt that he was in such a tight spot that there was no way out and he did not expect to survive. Often, under such circumstances, he will have taken cover in a slit trench and become mildly jittery; shells are dropping around him when suddenly he hears an explosion, maybe sees a flash, and then recalls nothing until he is in an M.D.S. being attended to by the orderlies. An observer would, however, probably fill in the details somewhat as follows: Following the explosion, the man may have gone "berserk" or may lie cringing or jittery in the slit trench or lie, apparently stuporose, or he may simply appear dazed and only require modified assistance to reach a truck. On coming to the M.D.S. the symptoms described above assert themselves.

Treatment is as follows: A full and detailed account of all the incident is first obtained. The patient's confidence is enlisted. It is then explained to him that an explosion is not only

capable of blowing metal into his flesh but it can also, "blow fear into his mind," but that until that fear is removed, his symptoms will persist. He is persuaded that this process is easy and effective and a brief description of what is to transpire is given. He is then asked to lie on a couch and told that he is going to be given a little ether during which he must attempt to live it over once again in his mind's eye as vividly as if he were watching the whole of the events he has already described being re-enacted on a cinema screen. He is then told to close his eyes and slow ether administration is commenced with an open mask, the physician starting him off by saying somewhat as follows; "Now there you are again in the slit trench—you can see it all perfectly clearly again—who is with you and what is happening?"—and very rapidly he is encouraged and persuaded to commence his narrative. After a minute the physician assumes a more dramatic and vivid form of address, a towel is then placed on the mask and, in the classical case, the patient rapidly changes his narrative fashion from a reflective to a vivid topical mode; as if he were taking part once more in the events on the battlefield. He comes to the point where the shell exploded—at which point he may pass into a state closely resembling that which existed on the field of battle. At this point further research is necessary to determine what is the correct procedure but, on the whole, one tends to stop the ether at this point, smartly rouse the patient, and obtain from him details of his subsequent behaviour by a mixture of persuasion and encouragement. This only need be done in the barest outline and, as soon as one has got him back to the point which he originally remembered, he is rapidly and thoroughly woken up and the whole story recalled to him. Once again what follows requires research to determine the correct procedure. In many cases the patient spontaneously bursts into a flood of tears. Where this has not occurred an attempt has frequently been made to induce an emotional re-action, often to the extent of employing maudlin suggestion. Strong suggestion is then given him that he feels better and that his symptoms will disappear and he is sent back to the ward to sleep for a varying period up to twenty-four hours under sedatives.

I have formed the impression that this technique is of value and has a place in the clinical programme of a forward psychiatric centre dealing with acute battle casualties. It appears as if the sooner the patient is so handled the better. This seems certainly to be the case after forty-eight hours. The justification for this impression is entirely clinical and is based on the apparent disappearance of symptoms and the patient's testimony.

One can only speculate concerning the essential effective component parts of the technique and there are many points to consider, the most obvious being the emotional catharsis and the reintegration in consciousness of the previously forgotten material.

This is a preliminary report and it is preferred that exaggerated claims be not made and that one should content oneself with suggesting that the technique has a sphere of usefulness and commending it to skilled research workers for its proper evaluation.

An interesting development of the technique has been in the case of some psycho-somatic syndromes where a patient, e.g. one complaining of gastric symptoms, is invited to dwell on his symptoms as ether administration is commenced and, thereafter, invited to talk freely with some general guidance. Using this technique it frequently happens that the first occasion on which the symptoms were experienced is recalled, giving a valuable clue to the functional nature of the complaint and, where this has been associated with a strong emotional setting, beneficial effects seem to have occurred.

**Summary.**—In conclusion, the suggestion is put forward that a technique has been evolved which is rapid, convenient, cheap and practical under active service conditions for the recovery of amnesic material. Benefit appears to have followed the exhibition of this technique but there appear multiple possibilities to consider before one determines which are the critical therapeutic factors and which are the precise indications for its employment. Rapid reintegration of the lost memory with the present stream of consciousness and the emotional release seem to be possible therapeutic factors. It is suggested that the technique does not involve entirely the same mechanisms as either hypnosis or "narco-analysis" (pentothal) although all these methods have common factors.

### *Current Literature.*

SPARK, T. E. HESTER. **Infectious Mononucleosis : A Problem in Diagnosis.** *M. J. Australia.* 1942, November 7, v. 2, No. 19, 413-21. [26 refs.]

Infectious mononucleosis is defined as an acute febrile illness with a benign prognosis characterized by the great variability of its clinical signs and its typical hæmatological changes. It is to be regarded as a generalized reaction to infection and not as primarily a disorder of the blood, and it is of practical importance in its capacity to mimic much more serious diseases. A brief summary of the relevant literature is given under which the contributions of Pfeiffer (1889 and 1908), Sprunt and Evans (1920), Tidy and Morley (1921), Paul and Bunnell (1932) and Bernstein (1940) are epitomized [but the important monograph of Glanzmann is not mentioned]. Experimental evidence of the infectious nature of the disease was obtained by Wising (1939). Injection into monkeys of emulsions of lymph nodes from infected patients produced a very similar disease in them which was transmissible from monkey to monkey. A laboratory worker contracted infectious mononucleosis after pricking his finger with a knife which had been in contact with a gland from one of the animals.

Tidy has described three clinical forms: (1) glandular, (2) anginose and (3) febrile, but the author finds that in practice the disease is so protean as to defy classification, the only factor common to all forms being the increase in the non-granular elements of the blood. Sore throat is of frequent occurrence but is so variable in degree as to require a separate classification into four types (Bernstein), ranging from mere diffuse injection to membranous ulceration resembling diphtheria. Glandular enlargement, the most widely recognized sign, is itself very variable in extent and distribution, the involvement of the mesenteric and mediastinal groups of nodes appearing to produce the abdominal and thoracic symptoms which are sometimes prominent. Enlargement of the spleen is commonly observed and jaundice is occasionally seen. This may be attributed to obstruction of the bile duct by enlarged glands in the portal fissure. Although numerous epidemics have been described the degree of contagiousness is probably low. Sporadic cases are frequent and may be due to transmission by symptomless carriers. Very few cases have been recognized in Australia.

In adults the total number of leucocytes does not much exceed the normal limits, ranging from 5,000 to 15,000 per c.mm. A predominance of neutrophils early in the disease is soon succeeded by the typical increase in monocytes ranging between 60 per cent and 90 per cent. An abnormal form of monocyte, showing variability in size, structure and staining properties, is a characteristic feature in a blood film. The heterophile agglutination test, discovered accidentally by Paul and Bunnell, has identified many forms of the disease not previously recognized. Agglutination of sheep corpuscles by a serum dilution of more than 1 in 64 represents a positive result.

The differential diagnosis from sepsis, secondary syphilis, tuberculosis, lymphadenoma, leukaemia, diphtheria and typhoid is fully discussed and the paper concludes with a summary of the notes on 10 sporadic cases of the disease diagnosed in three Sydney hospitals since 1934. An abbreviated differential white cell count is shown for each case. Eight of them gave a positive reaction to the Paul-Bunnell test. Four were of the severe anginose type, tonsillar membrane being noted; mild icterus was described in another case. A biopsy of a lymph node made in the last case of the series showed fibrosis affecting the medullary tissue, the follicular structure being unaffected.

J. W. HEALY.

*Reprinted from "Bulletin of Hygiene," Vol. 18, No. 5.*

HARRIS, L. C. and SANER, R. G. **Rats as Vectors of Disease : A Survey of the Rats of Johannesburg.** *S. African J. M. Sci.* 1942, July, v. 7, Nos. 2-3, 160-72. [88 refs.]

In this paper are reported the results of an investigation planned to ascertain the incidence of disease in rats caught in Johannesburg, with particular reference to diseases transmissible to man. Only two large-scale surveys had been carried out previously, one by Moll (1917) in America and the other by Balfour (1922) in England. Six live rats (*Rattus rattus*) sent daily from the Johannesburg Public Health Department were killed with carbon monoxide and examined as follows: Blood, stained with Leishman's stain, was examined for *Spirillum minus* and *Bartonella muris*, and at the same time wet blood preparations were examined for *Trypanosoma lewisi*. For the detection of rabies, brain emulsion was injected intraperitoneally into guinea-pigs. For the detection of bacteria of the Salmonella group, the spleen and a portion of the liver were incubated in broth and cultured on MacConkey slopes and blood agar. Suspicious colonies were examined for the fermentation of sugars. Those positive were identified by agglutination. Where the agglutination test was positive the organisms were either brought to their highest titre, agglutinated with monospecific serum, or submitted to an agglutination absorption test. The rats were also inspected for superficial ulcers or other lesions such as might occur in rat leprosy, plague, tularæmia and sporotrichosis. Dark-field microscopical examinations of kidney emulsions were made for leptospira. Livers were inspected macroscopically for lesions of *Hepaticola hepatica* and *Cysticercus fasciolaris*, the bladder form of *Tænia crassicolis*. The intestines were searched for adult intestinal parasites and the fæces examined both for ova and parasites. A summary of the results is as follows (the numbers in brackets are the number of rats examined and the numbers following are those found to be infected): Rabies virus (132) 0; *Rickettsia mooseri* (132) 0; *Pasteurella pestis* (250) 0; *Bact. tularensis* (250) 0; Salmonella (100), *S. typhi-murium* 4, *S. enteritidis* 1; *Trypanosoma lewisi* (75) 19; *Spirillum minus* (132) 1; *Leptospira icterohæmorrhagiae* (100) 0; Sporotrichum (250) 0; *Tænia crassicolis* (42) 7; *Hymenolepis nana* (18) 1; *Hymenolepis diminuta* (28) 9; *Trichinella spiralis* (30) 0; *Hepaticola hepatica* (60) 10; *Syphacia obvelata* (18) 7; *Giardia intestinalis* (8) 0; *Cercomonas muris* (6) 5; *Clonorchis sinensis* (18) 0; *Bartonella muris*, unsplenectomized (84) 0, splenectomized (3) 2; *Mycoplepræ-murium* (250) 0.

The authors' comment on these findings. The fact that murine typhus was not isolated requires an explanation since it has been found in Potchefstroom rats. It cannot be the absence of vectors (*Xenopsylla cheopis*) since these fleas are found on Johannesburg rats. A possible reason lies in difference in temperature. The annual mean maximum temperature of Johannesburg is 5° F. lower than that of Potchefstroom. It is possible that *Rickettsia mooseri* does not thrive in the flea vector at the lower temperature. In support of this belief is the fact that murine typhus does not occur in colder climates. The absence of plague conforms with other experience. From 1906 to 1939, 99,095 rats and mice were examined by the South African Institute for Medical Research without a positive result. 5 per cent of the rats examined were infected with Salmonella. In view of the fairly high incidence of this disease in rats, stricter regulation of the rodent population should be observed, especially in places where food is stored or prepared for human consumption. The reason for the absence of *Leptospira* in South Africa remains to be discovered. In cases of jaundice of which the cause cannot be established, the introduction of agglutination tests might reveal the presence of this disease.

The authors also publish a very comprehensive table of the incidence of disease in rats (excluding plague) in various countries as recorded in available literature. They conclude that there is a high incidence of disease in Johannesburg rats, that many of these diseases are transmissible to man and that rigorous control of the rodent population is to be regarded as an essential public health measure, a conclusion with which many experienced public health officers in England will agree.

B. T. J. GLOVER.

Reprinted from "Bulletin of Hygiene," Vol. 18, No. 5.

HUDDLESON, I. F. **Immunity in Brucellosis.** *Bact. Reviews.* 1942, June, v. 6, No. 2, 111-42. [85 refs.]

The data concerning active immunity to *Brucella* infection in man and some species of animals is collected and reviewed. Many years ago it was noted that many infected cattle aborted only once and the possibility was suggested that an immunity against abortion could be acquired from infection. There is no doubt that this is the case. Another important series of observations concerning *Brucella* infection and calves indicates that newly-born calves are capable of resisting infection. Although *Brucella* can be recovered from calves during and shortly after the feeding with milk containing live organisms, these bacteria disappear from the tissues some weeks after the feeding is discontinued. This resistance does not necessarily come from colostrum which may contain specific antibodies, for calves from non-infected cows, which do not receive colostrum containing *Brucella* antibodies, appear to be just as resistant to infection up to a certain age as those that do. A small percentage, however, may become infected under natural conditions and remain so to maturity.

The early studies on the production of immunity in cattle by artificial means were directed towards preventing the chief symptom, premature expulsion of the foetus. Little consideration was given to the prevention of active infection; this objective was pursued even after it was known that *Brucella* may be present in the milk of infected cows. Some of the later literature demonstrates that it is possible to inject both pregnant and non-pregnant cattle with a live culture of very low virulence without harmful results, although the agglutinins formed because of this make it difficult to detect infection by the agglutination test. A culture of moderate virulence, Strain 19, is now used and reports suggest that calves between the ages of four and six months should be treated with this strain. Numerous records are cited of the encouraging results obtained with this strain in protecting cattle after they reach breeding age and a prolonged agglutinin titre is avoided by vaccinating calves at ages between four and eight months. A high degree of active immunity may be produced against natural infection during the first pregnancy and this immunity remains even during the second and third pregnancies. The organism, when injected in calves, does not establish itself in the animal body and produce the carrier state; calves and young heifers show an agglutinin titre for only a few months after vaccination.

The infected goat continues to be a great source of infection throughout the world, and so far the injection of goats with live *Br. abortus* or with a culture filtrate prepared from *Br. melitensis* appears to be of no value in actively immunizing them against infection with *Br. melitensis*.

Recently Huddleson has obtained from live *Brucella* a water-soluble immunizing antigen which is destroyed by most antiseptics and by heat. It appears that it is now possible to induce an active immunity without the use of living cells, a result hitherto not attained and the immunizing antigen in the cell possesses labile characteristics.

In man, there is evidence that an acquired immunity following clinical or sub-clinical infection occurs and in fact is common in veterinarians, certain packing house employees, farmers and laboratory workers. There is, however, no certain indicator of active immunity to *Brucella* infection in man and the evidence rests on the results of skin sensitivity and opsonic tests. As yet there is no safe and effective vaccine for human use.

From observations made it would seem certain that an immunity which is produced against one of the types of *Brucella* will protect against an infection by the other two. R. LÖVELL.

*Reprinted from "Bulletin of Hygiene," Vol. 18, No. 5.*

PURRIEL, P., PIAGGIO, A. A. and RISSO, R. Investigaciones sobre infección brucelosa realizadas en las usinas de pasteurización de leche de Montevideo "Conaprole." **[Incidence of Brucellosis in a Pasteurizing Plant in Montevideo.]** *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1942. Mar., v. 20, No. 3, 225-31.

The plant referred to employs 1,200 workers and at it nearly 200,000 litres of milk are pasteurized daily. There are four small establishments in the town selling raw milk. Inves-

tigation of the Montevideo cattle showed 34.4 per cent to react for *Brucella*. The author tested 1,173 of the workers and staff [stated as 1,193 and the percentage is worked out in the paper on this total]; 955 were men and 218 were women. Altogether 190 were positive, 16.2 per cent [wrongly given as 15.9]; 130 among the men, 13.6 per cent and 60 among the women, 27.5 per cent. The rate among the women, double that among the men, is ascribed to the closer contact of the former with the cattle and the infected milk. H. HAROLD SCOTT.

*Reprinted from "Bulletin of Hygiene," Vol. 18, No. 5.*

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### Reviews.

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**THE UNFIT MADE FIT.** By Dr. Harold Balme. Published for the British Council in Great Britain and Northern Ireland, by Sir Isaac Pitman & Sons, Ltd., and overseas (including Eire) by Longmans Green & Co. Pp. 32. Price 1s.

This brochure deals with the rehabilitation of the injured. While appreciating that such a process requires due consideration of the psychological trauma in addition to the physical injury, the booklet concerns itself chiefly with the physical measures undertaken to produce an optimum end result.

The recent advances in physical rehabilitation are considerable including, as they do, special lines of treatment to counteract the after-effects of injury or disease.

The photographic illustrations are excellent and the information contained in the text provides a review of the modern application of physical methods.

These and similar methods play an important part in the treatment of people whose illness is nervous or mental rather than physical and in this type of case the importance of "team-work therapy" is stressed.

The role of occupational therapy as an agent for diversionary treatment, vocational treatment and specific therapeutic treatment is discussed.

This brochure should serve to stimulate the interest of every medical man in the rapid growth and potentialities of this form of rehabilitation therapy.

**A TEXTBOOK OF PSYCHIATRY FOR STUDENTS AND PRACTITIONERS.** Sixth Edition. By D. K. Henderson, M.D.Edin., F.R.F.P.S.Glas., F.R.C.P.E., and R. D. Gillespie, M.D. Glas., F.R.C.P.Lond., D.P.M.Lond. Oxford University Press. London: Sir Humphrey Milford. 1944. Pp. xii + 719. Price 25s. net.

The appearance of the sixth edition of this well-known textbook by Professor D. K. Henderson and Air Commodore R. D. Gillespie is a sign of the times. From the way the four impressions of the fifth edition have disappeared it is obvious that this is a popular textbook and the demand for a sixth edition signifies also a growing interest in psychiatry. A comparison of this edition with the first, published in 1927, demonstrates the tremendous progress made in the subject in less than twenty years. It is a matter for sincere congratulation to both authors that this new edition has been brought so thoroughly up to date—it must be a formidable task constantly to maintain in modern form a textbook of seven hundred pages.

Extensive additions have been made to the text of the last impression of the fifth edition, and the authors have added a chapter on what they acknowledge as the "dramatic successes attained by methods of physical treatment." In this chapter are gathered such empirical methods of treatment as insulin therapy, continuous narcosis, cardiazol and electric convulsion therapy, narco-analysis and leucotomy. The description of these methods is sufficiently detailed to give a clear picture of their technical requirements. It is wisely stressed in the text that doctors should have first-hand experience at some clinic practising the methods



before undertaking work of this character, and that they require the assistance of similarly experienced and trained nursing staff. This is an important matter which can never be over emphasized. The light hearted adoption of special techniques in psychiatry without careful preparation and experience on the part of doctors and nursing staffs is productive only of trouble and the resultant discrediting of these empiric methods.

Another change, likely to produce some discussion among experts, is the inclusion of dementia paranoiacs, paraphrenia and paranoia in one group entirely severed from schizophrenia. It makes for clarity and simplicity for students but there will be those who will ask whether such widely divergent characters as the often very normal middle-aged paranoiac, the very obviously insane and hallucinated paraphrenic and the rapidly deteriorating young paranoid schizophrenic are rightly regarded as members of a common ætiological group.

Epilepsy is well discussed (there are considerable additions to this chapter) and there is another sign of the times in that the clinical sections of the book are opened by the psychoneurotic reaction types. Here again there are many who would prefer to see the authors discard the psycho- and boldly support the use of "neurosis" and "neurotic" for psychoneuroses and neuroses alike. The authors, in company with many psychiatrists, clearly wish for fresh consideration to be given to our conceptions of the obsessional neuroses or obsessive compulsive states, and perhaps they would include neurasthenia, especially from the ætiological point of view.

The long chapter on the organic reaction types is excellent, the section on psychoses associated with syphilis being particularly good in presentation and in its detailed descriptions. There is a section on mental states due to pellagra of importance to Service medical officers who are seldom sufficiently aware of the mental and physical symptoms associated with pellagra. Such dramatic improvement follows the use of nicotinic acid that admission to mental hospitals should be unnecessary provided diagnosis is promptly made. The condition is adequately described except for the fact that the skin lesions can occur on the feet as well as on the hands, a point of some importance to medical officers who may be looking after native troops, either friendly or enemy prisoners, whose feet are often habitually bare and which show very characteristic lesions in pellagrins.

Of special interest to the Service doctor is the chapter on psychoses and psychoneuroses in war. Naturally the many lesions of the present war have yet to be made available for publication. But the authors rightly insist on the importance of selection in the personnel of fighting services, which surely will receive whole-hearted agreement among readers of this *Journal*. Indeed, the Army has built up such an advanced and efficient organization for the selection and accurate placing of its personnel of all ranks, to say nothing of its therapeutic care of psychiatric casualties all over the world, that it would add to the chapter's usefulness for the student and practitioner to know something of the Army's two war-time Directorates, Selection of Personnel and Army Psychiatry.

In a book ostensibly written for students and practitioners it is respectfully suggested to the authors that the next edition contain a whole chapter on Insomnia and its treatment, with the common drugs used and their physiological action. The successful treatment of insomnia occupies an important place in the handling of all mental illness, minor or major. Incidentally, on looking up the references to insomnia in the index no reference of any sort to insomnia or sleeplessness could be found on page 190 as indicated by the index. It is only fair to add that no other lesion of the index could be found after a conscientious search. But these are carping criticisms—this is the best edition of a grand book, a book essential to every psychiatrist, and a very useful textbook for students to use. It is very readable and is distinguished among books on Psychiatry by its admirable collection of illustrative cases. The enthusiasm of both authors for their subject pervades the book, and yet everywhere a sane, balanced and reasoned attitude to the problems of psychiatry is evident. The authors, in an interesting historical survey, point out that psychiatry is entering on a fresh period of activity, swinging away from the mental hospital and becoming more actively social or

communal. The authors are right, and we believe that the Army will make extensive contributions to demonstrate the social value of applied psychiatry. The publishers must be congratulated on getting the book so well printed and bound in difficult times. G. W. B. J.

THE MODERN TREATMENT OF SYPHILIS. Second Edition. 1941. Third printing. 1944. By Joseph Earle Moore, M.D. With five collaborators. London: Baillière, Tindall & Cox. 1944. Pp. xii + 717.

That the treatment of syphilis is a matter of very considerable importance is evidenced by the fact that "The Modern Treatment of Syphilis," by Joseph Earle Moore, has now reached a second edition and a third printing. Since the second edition appeared in 1941 the chapter on the Intensive Arsenotherapy of Syphilis has been completely re-written and considerably lengthened and a chapter on Venereal Disease Control in the Army and Navy added. Unfortunately, intensive arsenotherapy, though it appears to have a very satisfactory effect on early syphilis, carries a comparatively high mortality rate if compressed into ten days or less; with neo-arsphenamine the death-rate was 1 in 88 and with mapharside 1 in 250. Toxic encephalopathy too is much more common than with standard treatment, occurring in 1 per cent of patients, of whom about half die. It is made clear that with a dose of mapharside considered to be a curative one the longer the time over which it is given, within limits, the greater the margin of safety. This is well brought out in Table 126, from which it will be seen that when the whole treatment is compressed into from five days to three weeks the mortality is 1 in 200 to 1 in 400; from six to ten weeks 1 in 400 to 1 in 1,000, and from ten to twenty weeks 1 in 1,000 to 1 in 3,000.

The foregoing remarks refer to early syphilis; the effects of intensive arsenotherapy on syphilis in the pregnant woman and on late syphilis cannot yet be evaluated.

The chapter on Venereal Disease Control in the Army and Navy shows the rates from 1840 to 1940, and clearly demonstrates how they rose in each of the previous wars—the Mexican War; the Civil War, the Spanish-American War, and World War I, when ratios per thousand per annum were approximately 160, 190, 180 and 110 respectively; these may be compared with a figure of about 40 for the present war. It is of interest to note that the Naval figures have always been higher than the Army ones.

As regards control of venereal disease, the first desideratum is to reduce the incidence in the civil population whence, obviously, most of the Service infections arise, the second is early diagnosis and treatment which are amply provided for in the armed forces, the third is what are known as "substitutive" activities which correspond to what we should call "welfare," the fourth is prophylaxis and the fifth education. There is an interesting section on punitive measures which are condemned as unlikely to achieve their purpose, and most venereologists will agree wholeheartedly with this.

(It should be noted that an American Serviceman forfeits pay whilst in hospital for venereal disease; possibly this is partly the reason why so much trouble has been taken to put treatment on an ambulatory basis.)

Finally, there is a section on the Venereal Disease Control Officer in this war which shows what he can and ought to do.

This book is a mine of information and should be studied by every syphilologist; the treatment of early syphilis may be easy, but that of late syphilis will often tax the ingenuity of the most experienced.

T. E. O.

MEDICAL CARE FOR CITIZENS. Published for P.E.P. (Political and Economic Planning) by Europa Publications, Ltd., London, W.C.1. Pp. 32. Price 1s.

We have received a copy of the above pamphlet, which has been forwarded to the Library, Royal Army Medical College.

PROCEEDINGS OF THE AMERICAN PHILOSOPHICAL SOCIETY. Held at Philadelphia for Promoting Useful Knowledge. Vol. 88, No. 3. September 8, 1944. Symposium on War-time Advances in Medicine and the R.A.F. Penrose, Jr., Memorial Lecture.

A copy of the above can be seen, by those interested, in the American Library, U.S. Office of War Information, American Embassy, London.

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### Retirements.

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THE closing months of 1944 saw the retirement of four officers to whom the Corps owes much for their work during the war years. They are :—

Major-General Sir Percy S. Tomlinson, *K.B.E., C.B., D.S.O., F.R.C.P., K.H.P.*

Major-General J. A. Manifold, *C.B., D.S.O., M.D., K.H.P.*

Major-General O. W. McSheehy, *C.B., D.S.O., O.B.E., M.B., K.H.S.*

Major-General S. W. Kyle, *M.B.*

Each, in his own niche, had done much, under often trying circumstances, to weld the Corps into its present efficient state.

It was given to Sir Percy Tomlinson to direct the medical arrangements in the Middle East from the days of peace to the triumphal conclusion of the North African campaign. He had the unique experience of being the only General Officer to hold uninterrupted office during these eventful years. The inexorable provisions of the Royal Warrant led to his retirement when actively engaged in another important task. Beloved by all who served under him he is still seen frequently in our midst, a shining example of the ever-youthful heart.

After a distinguished career as a pathologist, Major-General Manifold was just as successful as an administrator. The professional side of the Corps owes him much.

Major-General McSheehy has had long experience as an administrator. His never failing interest in all his officers has always been an outstanding characteristic. (He is, for the time being, still serving.)

Major-General Kyle had retired as a Colonel and was then employed as a temporary Major-General. His most important work was done in the War Office away from the limelight. Here he carried out one of the most delicate and difficult tasks with never-failing tact and urbanity.

One and all, these officers earned the respect and affection of those who knew them and served under them. We wish to take this opportunity of wishing them many happy days of useful employment into whatever niche they may now fit themselves. We know that their interest in the Corps will ever remain and assure them we hope that, like the Green Bay Tree, they will continue to flourish.

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### Notices.

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#### ARMY MEDICAL DEPARTMENT BULLETIN.

*A.M.D. Bulletin* No. 42 and Supplement No. 19, December, 1944, have now been published by the War Office. Distribution scale : One copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

##### Article No.

322. *Results of Forward Surgery.*—Figures to show the good results of forward surgery in the invasion of Europe (June-August, 1944).

323. *Care of Inert Patients during Transit to Base.*—Dangers that beset the inert patient and what should be done to guard against their effects.
324. *What Kind of Dysentery?*—An account of dysentery among British Prisoners of War in an Italian hospital with comments on the medical aspects.
325. *Does Her Shoe Pinch?*—On the approach to foot problems of the A.T.S.
326. *Air-Conditioned Wards.*—A guide to help in deciding the best use that can be made of air-conditioned wards as more of these become available in Army hospitals in the tropics.
327. *Why Not Write a Thesis?*—A suggestion to Army medical officers that their experiences may contain the essentials of a thesis ; advice is given on collecting material, and help is offered from the Director of Biological Research, War Office.
328. *If You Don't Receive It.*—A reminder that *A.M.D. Bulletin* is distributed monthly as a personal issue to every Medical and Dental Officer. Anyone not in regular receipt of the publication should apply to his A.D.M.S. through his O.C. in the usual manner.

*Supplement No. 19. Tropical Specimens For R.A.M. College.*—A description of entomological and pathological specimens required for teaching at the R.A.M. College ; an appeal to officers to help by sending specimens, and advice on their collection, preservation, and transmission.

*A.M.D. Bulletin No. 43*, January, 1945, and an Index for 1943 have now been published by the War Office. Distribution scale : One copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

329. *Tissue Damage, Blood Loss, and " Shock."*—Work on " shock " by a joint Army and M.R.C. team in Italy has shown, among other things, that medical officers tend to over-estimate tissue damage, under-estimate blood loss, and use the word "shock" when it would be more helpful to record actual observations.
330. *Rather Prolonged " Influenza."*—A reminder that influenza is a short illness unless complicated by secondary infection of the respiratory tract, and an account of the steps that should be taken to exclude typhoid and paratyphoid if pyrexia of uncertain origin is present.
331. *Intractable Intestinal Amœbiasis.*—At a recent meeting of the Royal Society of Tropical Medicine and Hygiene speakers discussed the wartime incidence, prevention and treatment of intractable intestinal amœbiasis. This is a summarized account of the meeting. Injections of emetine alone are to be avoided ; full combined treatment is required with good supervision ; penicillin may play a useful part in treatment of resistant cases.
332. *Care of the Immobilized Arm.*—A reminder of the steps to be taken to prevent contracture of the fingers if an arm is immobilized for treatment of any injury. Supervised active finger movements should be undertaken from the start, and splints or plasters applied to fix the wrist in dorsiflexion should never extend beyond the proximal palmar crease.
333. *Unabsorbable Materials in War Surgery.*—For many purposes in surgery, unabsorbable sutures have advantages over catgut. But their use is sometimes overdone by those who lose sight of their disadvantages. This article puts the various issues in perspective.
334. *Death from Mismanaged Diphtheria.*—A reminder that adequate dosage with anti-toxin is essential as soon as clinical suspicions of diphtheria are aroused. Anti-toxin treatment must not await bacteriological reports, nor must penicillin be regarded as a substitute for full doses of antitoxin, though it may be given as an addition to the treatment.

## EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps and articles of a non-scientific character may be accepted for publication under a nom-de-plume.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twelve reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twelve excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W.1."

## MANAGER'S NOTICES.

The Annual Subscription for the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is £1 payable in advance. Single copies, 2s. 6d. per copy.

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# Journal of the Royal Army Medical Corps.

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## *Original Communications.*

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### THE ORGANIZATION OF ADVANCED SURGICAL TEAMS IN NEW GUINEA.

By Major J. M. YEATES,  
*Australian Army Medical Corps.*

[Received January 25, 1945.]

[The Editor regrets that pressure on space has necessitated considerable condensation of part of this article. The latter part is as written by Major Yeates and, so far as is possible, the style and humour have been retained throughout. A tabulated list of surgical equipment has been omitted.]

#### FOREWORD.

THIS was written after experiences in the Wau-Salamaua area. This campaign was in mountainous country with skilfully planned flanking attacks. It was necessary to work within a few hours of the front, otherwise all the casualties which occur about sunset—a favourite time for Japanese counter-attacks—must remain in the jungle all night. It was impossible for the natives to carry stretchers after dark. We often had to work in a tiny “A.D.S.” for a battalion or even for one or two companies.

The difficulties in getting back the wounded have one dubious advantage for the surgeon—a sudden, tremendous rush of cases is uncommon. Twelve natives were required for one stretcher case and, as the number was limited, it was unusual for more than two or three badly wounded to arrive together.

#### PERSONNEL.

The following were essential :—

(a) Three officers—surgeon, medical officer and stretcher-bearer officer.

Remember that there are always medical cases requiring attention and it is quite useless to inform a cerebral malaria or a meningitis that this is “surgery only.” A wise surgeon will always have such indispensables as intravenous quinine, Dagenan and sulphaguanadine.

(b) Four theatre assistants—(i) Assistant at operation ; (ii) sterilization ; (iii) preparation ; (iv) the very numerous general duties.

(c) One anæsthetist—easily learned by an intelligent orderly.

(d) One for resuscitation.

(e) Fourteen others—clerk, cook, nursing, hygiene, water, etc.

There must be a definite man detailed for every conceivable task to avoid such things as

"the light's fused, sir," "the kerosene drum is empty," or "this patient is having a severe rigor."

#### TRANSPORT.

Pounds avoirdupois caused more worry than did the acquiring of pounds sterling in former days.

We depended on transport planes lifting 5,000 pounds and on Native "boys" carrying a maximum of 40 pounds for five to six hours a day.

Sixteen boys carried the purely surgical equipment (640 pounds). With this we could perform any operation in the open air without any cover, and give saline, serum or blood.

Nine boys were required for a complete and adequate electric light outfit (1 for light and standard, 3 for batteries, 4 for battery charger and 1 for 4 gallons of petrol). A good light is essential. If necessary the charger may be left as fully charged batteries last eight hours and Brigade or Signals may have one.

Twenty to twenty-five boys are required for accommodation stores.

*Note.*—You save boys by moving forward whenever possible. In one day fifty boys will move you forward five or six miles. The same boys, in the same time, will bring only four patients back. (The Staff Captain soon finds this out.)

#### EQUIPMENT.

*Accommodation Stores.*—Cut out Army stretchers and tents. Stretchers can be made from bamboo (or other suitable timber) and blankets.

"Sisalcraft" is used in place of tents. It is one-tenth the weight of canvas and is 100 per cent waterproof if used correctly. It is in rolls of 300 feet by, preferably, 5 feet. Two rolls, carried by four boys, will cover six huts each 15 by 20 feet.

Nearly all accommodation stores can be dropped in excellent condition by transport planes.

#### SITE.

In the unusual event of the decision being left to the surgeon, consider these factors in order :—

- (i) Proximity to front—preferably one to two hours and close to Battalion headquarters.
- (ii) Water supply—usually no trouble in New Guinea but the fiercest fighting is usually for high ground where water supply is poorest. Bamboo pipes can be used as gutters for sisalcraft roofs.
- (iii) Cover—(a) from shells and mortars, (b) from the air. Behind a ridge, deep in trees, gives good protection. The cook-house should be a good hundred yards from the wards as the Japanese are keen on SMOKE.
- (iv) Terrain—a gentle slope, with thick trees but little undergrowth, is ideal.
- (v) Proximity to A.S.C.—but keep a sensible distance from a "dropping ground."

#### PACKING.

Pack in standard weights of 40 pounds for each boy. So much heavy stuff in each box with lighter for packing.

#### ADVANCING TO NEW SITE.

Send an advance party to the selected site one or two days in advance. They construct frames for huts, etc. If new stores are dropped they can roof the huts and build the beds. If not, the old site is closed down, the sisalcraft and blankets already sewn up (called "bed-sails") are rolled up and carried to the new site. With the frame already prepared the roof and beds can be completed in a couple of hours.

#### ACCOMMODATION.

We estimated, arbitrarily, for fifty operations without fresh stocks and holding capacity for fifty also.

Huts required are : M.I. room, store, resuscitation, theatre and four wards each with twelve to fourteen bunks. Extra ones for cook-house and sleeping quarters are desirable.

The usual size of these huts was :—

M.I. room and store, 10 feet by 15 feet each.

Resuscitation and theatre, 20 feet by 15 feet each.

Two wards with "double deckers," 20 feet by 10 feet each—24 patients.

Two surgical wards with "single deckers," 20 feet by 30 feet—32 patients.

Each hut was 6 feet 6 inches high at "ceiling level" and the pitch of the roof was 45 degrees with a good over-hang.

To avoid nails, or other form of fixation, sisalcraft was hung transversely, each strip supported by ridge poles. Provided the overlap is 9 inches to 12 inches this is quite waterproof. On no occasion during six months was a piece of roofing dislodged by wind. If cover from the air is not perfect a special quick-drying paint must be applied to the sisalcraft before erecting it.

The beds for the surgical wards are quite removable—a frame 6 feet 6 inches by 2 feet, resting on trestles, with handles only 6 inches long. These portable beds, called "bed-sails" by the natives, are simply a bamboo frame with a blanket sewn firmly round. They fit the operating table and trestles.

Upper bunks are usually reserved for medical cases but may be used for walking wounded when recovered from their anæsthetic.

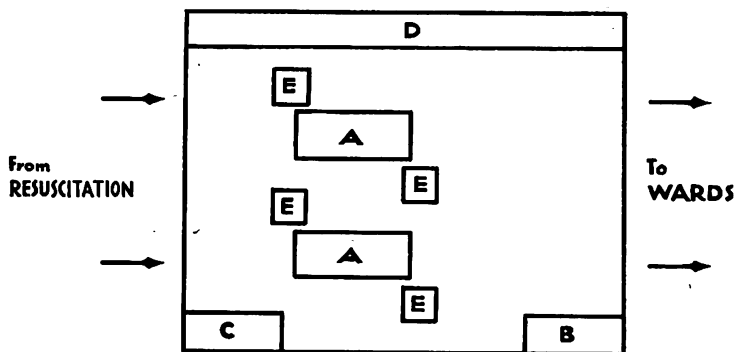
If air cover is good the huts may be built close together. Resuscitation, theatre and one surgical ward should be nearly adjacent to avoid a long carry on a dark, muddy, rainy night.

#### THEATRE.

The one-surgeon two-table system saves at least twenty minutes between cases. In every case, except one, a two-table theatre was constructed. The minimum size is 15 feet by 20 feet.

Build only one operating table complete, for the other use a bed-sail on stretchers.

The long, wide, full length shelf is very useful. On it you can unpack everything on a "functional" basis. This saves endless "rummaging" in the middle of operations. The only snag to complete unpacking is damage by the weather, especially moulds and rust.



Theatre layout : A, operating tables, 6 feet 3 inches by 1 foot 9 inches ; B, table for sterilization ; C, wash table ; D, three-decker shelf which holds all stores ; E, portable tables.

The answer is a partial re-pack on a functional basis having samples of each contained item on the lids of the boxes.

If you leave the boxes packed on a "travelling" basis the muddle will be amazing.

For the first few days "furnishings" are rough and scanty. In spare moments extra "gadgets" are constructed, wires slung overhead for holding lamps and "Soluvacs." At



the end of a week every item should be visible and accessible and provision made for every contingency. Our final A.D.S. was, for every practical purpose, as good as a modern civilian theatre.

#### LIGHTING.

The answer is one or two Tilleys with spare parts and the electric light apparatus previously mentioned. The Tilley can be used for the induction of anæsthesia, excision of skin, fat and superficial muscle.

It is dangerous to excise more deeply without a beam of light. Some surgeons are fond of the surgeon's head-lamp. This appears to light the wound only with the "general" lighting extinguished—a very undesirable feature. But it is useful for an emergency.

Black-out, when necessary, is very easily obtained by hanging blankets. Sisalcraft is 100 per cent opaque and big eaves are helpful.

#### HEATING.

No less than four Primus stoves are needed in the theatre, one for the instrument sterilizer, one for heating water in the 4-gallon copper cistern, and one for the linen sterilizer.

The fourth one is produced at a moment's notice when a sudden "failure" occurs.

In New Guinea the temperature is usually warm. On the mountains, the mere hanging of blankets as for a black-out will soon raise the temperature nearly to body heat (with three Primuses and one Tilley in action).

#### STERILIZATION.

There is little to add to previous accounts. Everything is boiled. It is better to have a second container for towels, gloves, etc. If none is obtainable, a 4-gallon kerosene drum cut longitudinally answers the purpose.

#### ANÆSTHESIA.

Pentothal was used for every case except abdominals. In no single case did pentothal fail to produce anæsthesia nor did any untoward symptoms occur. Atropine was never used. Morphine was used in large doses. Every conscious patient was given  $\frac{1}{4}$  grain thirty minutes before operation, providing he had received no injection in the hour previous. In earlier days morphine was used more sparingly, as recommended by Captain Morton. In these cases induction was less smooth, more anæsthesia was required and more troubles like coughing and sneezing were prevalent.

One patient had received 1 (one) grain of morphine in the previous twelve hours. His anæsthetic was delightful.

One can faithfully record that big doses of morphine never caused serious respiratory depression.

In our unit the pentothal injections were given by the dental officer, his staff-serjeant or a trained orderly. They received only two instructions: (a) Be personally responsible for every breath the patient breathes; (b) if he kicks, give him a little more.

Pentothal was given with the patient in every conceivable position from prone to supine. With a little ingenuity one can always find a handy vein.

An airway was NOT used (but was always kept in sight). It is a great mistake to introduce one "as a precaution." This often causes coughing, etc.

In more than half the cases, more than 1 gram of pentothal was used—on many occasions perhaps 22 to 25 c.c. being the total. There is thus a considerable wastage, and when indenting it is wise to reckon on 2 grams for each casualty.

When a "session" is commencing—say 12 cases—time and anæsthetic are saved by preparing enough solution in advance in a sterile basin.

One very pretty innovation was made by the dental officer (Captain McGrath). This was a plaster slab 8 inches by 6 inches by 1 inch. Before this had set some 8 "dimples" were made by pressing in a pentothal ampoule. This is a small point, but it saved many an

ampoule from being knocked over. Syringes were kept in S.V.M. in a "Cellona" tin, being rinsed with ether and then  $\frac{1}{2}$  c.c. of the distilled water before use.

(S.V.M. is often scarce. For this reason we used it for two things only—(1) syringes and cutting instrument; (2) priming.)

It would be interesting to know whether it is safe to dissolve 1 gram pentothal in only 10 c.c. water and inject twice as slowly. After all the patient would then receive the same amount in the same time. The great advantage would be the necessity for 10 c.c. syringes only. These are much more convenient and more easily obtained than the 20 c.c. which is a very ungainly instrument with its invariable central nozzle.

Pentothal has still more virtues. It is only a fraction the weight of ether (especially when allowance is made for bottles), and it appears to keep indefinitely.

Finally the troops actually enjoy the induction—"Wacko!" said one lad as he went under.

#### IN ACTION.

##### (1) ADMISSION.

The best plan is to have the natives carry the patients into the "Resuscitation" hut. The "A and D" clerk sees them pass the door of the M.I. room and can easily come and obtain the necessary particulars. (Once the natives place a stretcher down, it is the devil's own job to persuade them to carry it another yard.)

The "Resuscitation" hut is built large enough to serve as a reception room in addition. Avoid at all costs allowing patients to go to the wards BEFORE operation. This causes endless difficulties. Sometimes you may be forced. One-way traffic is the ideal, with waiting patients in sight of the surgeon. In rush periods a nursing orderly is necessary. In quiet times the "prep" man is capable of doing the work.

##### (2) RESUSCITATION.

If this be necessary, then blood is the thing to give. If this be impossible, serum is used instead (1 litre of wet serum in "Soluvac" bottle. This appears to keep indefinitely even in warm areas).

With good planning blood can be given to nearly all deserving cases provided the rush is not too acute.

The following arrangement worked well:—

(i) The R.M.O. telephones to say, e.g., "two severely injured will arrive in one and a half hours. Both are very shocked. Types A2 and O4."

(ii) The surgeon informs his blood transfusion orderly (an officer if available).

(iii) The orderly phones the nearest available source of donors, e.g. BDE or BN HQ (previously arranged).

(iv) Usually three or four eager donors arrive in ten to twenty minutes.

(v) Blood is collected and kept standing in a basin of cold water.

(vi) The blood is then given to the patients *within a few minutes* of arrival.

This system really means having a private "blood bank." Once or twice blood was thrown away, but on at least one occasion a life was definitely saved. (The patient arrived without pulse and actually stopped breathing. He was given 1 pint of blood in ten minutes, and 4 pints in the next four hours—then amputation and rapid recovery.)

Needless to say everything necessary for resuscitation is kept in the resuscitation room. Have hot water bags ready as well as blood.

At one time we had a series of severe "rigors" necessitating cessation of the transfusion (four consecutively).

No reactions have occurred since the use of "Soluvacs" filled with normal saline. This is certainly wasteful, but the tubing system must be rinsed thoroughly with DISTILLED water. The saline is used for this, and the empty bottle then used as a receptacle. Saline has only one other use—in perforation of bowel.

**(3) PREPARATION.**

The preparation man has a big job and he is trained to do everything in a certain order.

(a) Urinal, sip of water, cigarette, morphia (if necessary), A.T.S.; personal effects, denture and F.M. Card to be placed in a fixed spot.

(b) Move patient from clumsy native stretcher (15 feet long) to bed-sail which is always lying in readiness—prepared with ground-sheet on top. (1 patient in 10 cannot be moved before anæsthetic.) In these cases the native stretcher is carried into the theatre, placed on the rigid operating table, the bindings cut, and the poles removed, thus leaving the blanket or hessian only. After operation such a patient is placed on a bed-sail.

(c) Strip *completely* and wash in warm Dettol (when possible).

(d) Wash and shave the wounded region over a very large area—the complete circumference of limbs, and a foot in every direction.<sup>1</sup>

(e) Whilst the shaving is in progress, a good orderly will pick up valuable information, e.g. swelling, tenderness, crepitus, paralysis, palpable F.B.—sometimes 12 inches or 14 inches from the wound. In the absence of X-rays the surgeon must rely on other factors for guidance, and tenderness on shaving is a useful guide as to direction.

(f) Finally iodine to skin, sterile towel and blanket.

When possible the surgeon should examine the patient AFTER preparation but BEFORE the anæsthetic. The general position is now much clearer and correct deductions can be usually made.

Ask the patient the type of missile and his POSITION when injured. If reasonable movement is present in a limb, fracture is almost certainly excluded.

By these methods nearly all large F.B.s can be found and removed.

**(4) OPERATION.**

A certain definite order in "scrubbing up" is desirable. When the instrument man gives his word that all is ready, the first assistant scrubs. He will then arrange his instruments and drape the wound while the anæsthetist scrubs (having previously prepared his solutions and syringes). During the induction the surgeon scrubs. This saves hurrying the anæsthetist, and if he has a spot of trouble with the veins, he has time to try again. As soon as the patient loses consciousness the assistant applies a towel-clip to the skin. This invariably causes movement and is the sign for more anæsthetic.

When the response to the "towel clip test" is negative, the patient is ready. By this arrangement the operation can commence without a second's delay the moment the surgeon is ready.

Whilst the operation is in progress the instrument man is boiling up a second set of tools (if available) and the "prep" man has the second patient on the second table and is busily engaged as before. At the end of the operation, the surgeon washes and removes gloves, writes up the F.M. Card (in ink) and the operation book. There may be just time for a cigarette. If the system is working well the next operation can be commenced at once. For maximum speed, apply vaseline gauze and dressings yourself, while the assistant is scrubbing.

An interval of five minutes is considered very good. More than ten minutes is poor. But this takes long training.

**(5) EVACUATION.**

Is usually by native bearers, who arrive consistently at breakfast time. Twelve boys are required for one patient. The boys prefer to make their own stretcher on the spot. See that it is not too narrow and that the bindings are secure. Otherwise the patient will be severely crushed. (Once the boys start it is difficult to stop them for any purpose.) Walking wounded and sick can be evacuated sooner if boys are obtained to carry their packs. One boy carries two packs.

<sup>1</sup>One case in ten requires anæsthetic before preparation can be completed.

## (6) SUPPLY.

Usually by the boy-line<sup>T</sup> or by dropping. Both are a little irregular so err on the side of excess stocks, particularly of important expendables, e.g. pentothal, gauze, kerosene.

Shortage of anæsthetics or kerosene will cause complete paralysis. Always keep a personal eye on these two items.

For the same reason a spare syringe or two is essential.

Indents are completed once weekly. With a little practice one can soon estimate future needs and so avoid sending frantic signals (a sign of inefficiency).

Stock-taking is enormously facilitated by having all your stores displayed in the "Woolworth" style, and deficiencies become obvious. If you rely on promises and packing invoices, you will suffer sharp shocks.

## TECHNIQUE.

It is beyond the scope of these hurried notes to discuss surgical technique. However, a few points call for comment :—

## (1) FRACTURE OF THE FEMUR.

Technical instructions allow you a choice of plaster spica or Thomas splint. The writer is now more firmly convinced than ever after the Buna-Soputa fighting that not only is the Thomas splint preferable, but a spica may be positively harmful.

Spica treatment enjoyed a degree of popularity in the Middle East largely because of the Tobruk cases. Here, of course, circumstances were nearly ideal—all the resources of an Australian General Hospital, including warmth, orthopædic table and plenty of assistance. With the resources of a tiny A.D.S., applying a spica is a harrowing business. It has the following disadvantages :—

(a) The anæsthetic must be continued for a further twenty minutes at least, as you cannot risk movement until setting has occurred.

(b) The patient (already shocked from a large excision and blood loss) must be completely exposed.

(c) Worse than everything is the inevitable moving of the patient (as he is raised precariously on to a tin or basin) and often the FRAGMENTS. Nothing is more shocking than grating of bone with tearing of muscle. Any surgeon who says it is always avoidable has not applied a spica under front line conditions.

(d) Unless you are particularly skilful and fortunate in choice of assistants, you will end up with one item out of position—the knee fully extended, or the foot plantar-flexed.

(e) For the first twenty-four hours (a critical time) the patient is clammy and uncomfortable.

(f) The risk of missing anaerobic infection is increased enormously.

(g) The weight of plaster is much greater. One boy can carry seven Thomas splints, but only enough plaster for two spicas.

(h) Minor items are difficulty in supply ("Cellona" comes from England), difficulty in removal, inability to use again, offensive smell, and increased nursing difficulties.

Compare this with the good old Thomas.

(a) The moment the operation is completed the anæsthetic is stopped and the patient at once covered completely with warm blankets (note the immediate improvement in the pulse).

(b) Two or three orderlies can now apply the splint, merely exposing one leg. With everything prepared in advance this job takes five minutes. (Orderlies seem to take a keen delight in applying a Thomas. If they are once shown the proper method, the surgeon need only supervise as he writes up his notes.)

(c) If the splint is a good fit, has soft well-soaped leather, and is applied well, the patient is most comfortable. A good efficiency test is to pick up the lower end of the splint (in the ward next morning) and move the leg through a wide range. This should be painless.

(d) Finally, these patients were evacuated on NATIVE stretchers over two, three and even four day trips. Captain Solomon (at M.D.S., Wau) reported that they all arrived in comfort and good order.

(2) FRACTURES IN GENERAL.

It has been clearly shown that plaster of Paris has some disadvantages in New Guinea. If a surgeon wishes to travel really light, he could dispense with plaster entirely by using Thomas splints for below knee fractures and Cramer wire for fore-arms (binders are better than anything for the humerus). Unlike civilian injuries many cases of fractured tibia have the fibula intact. These cases scarcely need extension and, therefore, even if fractured in the lower third they travel very well on a Thomas.

It will be admitted that plaster is ideal for fracture of BOTH bones in the lower third.

ACKNOWLEDGMENT.

The writer is indebted to Lieutenant-Colonel R. Smibert and Officers of the 2/2 Field Ambulance for much of the detail in construction and also to Major T. Ackland.

AN ACCOUNT OF THE MEDICAL SERVICES OF THE NATIONAL  
LIBERATION ARMY OF JUGOSLAVIA AND OF THE R.A.M.C.  
ASSISTANCE GIVEN TO IT.

By Colonel J. W. HIRST, *O.B.E., T.D.*

[Received February 1, 1945.]

" Travellers, like sea trout, should  
be caught fresh run, with their  
experiences still sticking to them."

(KIPLING)

I.—JUGOSLAVIA.

MANY new problems for the Allied military medical services have arisen with each successive year and campaign since 1939. Careful planning or rapid improvisation on the spot has, as a rule, provided solutions for each new set of circumstances. From this welter of experience, military medicine has evolved to what is now seen to be a reasonably good copy of modern scientific medicine. But the difficulties inherent to expeditionary force medicine, such as movement, supply, terrain and water supply (to name only a few), will always prevent the copy being perfect. Great as were the difficulties to be overcome by the Army Medical Services in the Western Desert, East Africa, New Guinea, Burma and Normandy, the Allies were never without the bare bones of essential "stripped-to-the-waist" medical equipment and man-power. Never were they without such basic framework as was the National Liberation Army of Yugoslavia (NLAJ) in its early days.

(The NLAJ is Marshal Tito's (Marshal Josip Broz) regular army. The Partisans are his organized, civilian, guerrilla bands but the term has come to mean all members of his forces. The Chetniks are General Draja Mikhailovitch's followers, who in Mr. Churchill's words, "are not fighting with the Allies," but who are not regarded with such bitter animosity by the NLAJ as the Ustikas (USTACHE) or Croatian Fascists.)

It is not the purpose of this article to attempt to write history or to discuss in any way Allied policy or Yugoslav politics. Yet it is necessary to tell something of the conditions prevailing in Slovenia, Croatia, Slavonia, Bosnia, Dalmatia, Serbia, and Montenegro when the British and U.S.A. forces towards the end of 1943 were first in a position to afford aid to the NLAJ in a really concrete form.

(It seems appropriate here to recall the medical aid which was rendered during and after World War I by many British doctors to Serbia. The names of four women—Ingليس, Sandes, Hartley and McPhail—are remembered but there were many others, men and women.)

Jugoslavia was only so christened in 1929 but had been brought into being in December, 1918, as the "Kingdom of the Serbs, Croats and Slovenes," by an amalgamation of the provinces named in the preceding paragraph. To weld such a mixture of races, laws, habits and territories into staunch national unity in a matter of twenty disturbed years would under any circumstances have been a gigantic task. It did not happen and, as is known, the country was over-run by the Germans in the summer of 1941, resistance being maintained only by the Chetniks and the Partisans, both independently adopting guerrilla tactics in the mountains. Quislings in Croatia and Serbia were established with German and Italian aid. For many subsequent months civil war ravaged the country. The position was made worse by the fact that the two anti-Axis forces became opposed also to one another. By the end of 1943, the Chetniks had virtually ceased all opposition to the invaders, but the NLAJ had grown to number 250,000 and had been able to obtain much equipment from the Allies and

from Italian Eastern Adriatic garrisons when Italy collapsed. To control the country, the Axis powers had at this time to maintain a garrison of some twenty German and other enemy divisions.

As a result of the invasion and civil war, millions of people were driven from their homes as a direct result of warfare or lack of food, general insecurity and harsh decrees made by the Germans in the interests of Lebensraum; others were deported for work in the Reich and her satellite countries. The average income per head of population was about £15 a year. Agricultural production had fallen by at least 50 per cent since prewar days. The death-rate had soared; the birth-rate had decreased; infant mortality and stillbirths had reached fantastic figures—in parts of Dalmatia 80 per cent of births were stillbirths. Transport by road or rail was so precarious that most of the population depended for food, clothing, footwear and fuel on what little they could produce themselves. Out of 650 railway stations in Croatia, 500 were burnt down. Rickets, tuberculosis, typhus and vitamin-deficiency diseases were rapidly increasing, mainly owing to widespread malnutrition. Medical supplies of all sorts were scarce, in particular such essentials as blood-grouping sera, anæsthetics, antiseptics, X-ray apparatus and the sulpha drugs.

Bosnian rakija—a poor kind of brandy containing at the most 18 per cent of alcohol—was a common substitute for surgical spirit. Most leg and thigh wounds were splinted with wood—home-made Diterix splints were popular, being easily made, adaptable in size and length and conveniently carried by medical personnel. Enemy medical stores were great prizes. Actions were fought by the NLAJ not to exterminate the enemy or to deprive him of territory but to capture a few pounds of salt or other vital munition. Small quantities of Allied medical stores, including morphia, plasma and vaccines were delivered at times—usually by air.

The position with regard to doctors, nurses and trained nursing and hygiene personnel was equally bad. There were only 6,000 registered doctors in Yugoslavia in 1939—about 1 to every 2,600 inhabitants. When the enemy over-ran the Balkans in 1941 such personnel suffered extremely heavily. Doctors had to flee as refugees or face death, imprisonment or deportation. Those who elected to share the hardships of guerrilla warfare with the Partisans experienced unbelievable trials and risks. Since the NLAJ had no “rear” or fixed base, patients, medical staffs and stores were compelled to move whenever the brigades or divisions moved and travel the same mountain tracks under the same conditions. This was due to the fact that for over two and a half years the NLAJ was unable to hold for any length of time a town containing a large civilian or military hospital building. The Germans seemed to have made a special point of destroying hospitals, or any other buildings capable of being used as such, which were not located in a town, e.g., the central state hospitals in Montenegro and East Bosnia and the children’s hospital on the River Piva were so destroyed. The wounded were never abandoned. Many battles such as those of the Prozor, Neretva and Praca were fought to prevent a hospital with its wounded falling into enemy hands. Such tactics were forced upon the NLAJ because the enemy on many occasions slaughtered all the patients and staff they captured before destroying the hospital. Under such circumstances the wastage of trained medical personnel, scanty to begin with, was enormous. A brigade had one doctor if it were lucky, and the divisional hospital (bolnica), which is similar to the British C.C.S., possibly four. Most of the “front-line” and first aid work was necessarily left to the troops themselves or to the battalion medical orderlies, a great many of whom were women. It occasionally happened that the sick and wounded could be left behind, well hidden in caves, attics and cellars, in the secret care of villagers, whilst the army withdrew into the mountains.

(An old peasant woman acquired a wide reputation in the NLAJ by amputating a leg in twelve minutes with household tools without an anæsthetic.)

Such was the economic and medical picture in the NLAJ towards the end of 1943. Yet in 1939, Yugoslavia, a country somewhat larger than Great Britain, with a population (16,000,000) approximately numbering that of Turkey, had the same railway track mileage per head as Great Britain, had as many motor cars proportionately as Ireland or Poland and

had an export trade equivalent to Denmark. In many ways, including medicine and hygiene, Yugoslavia was however years behind Germany, France or Great Britain. But the country had reached the transition period of the industrial revolution and, despite inefficient governments and officials, much progress was being made.

The conditions therefore under which the NLAJ had to continue its patriotic struggle were comparable with few in the history of the world. The soldiers were fighting week after week—guerrilla actions for the most part amongst snow-covered mountains—with a spirit of selflessness almost beyond previous imagination, for no pay, with hardly any training, with no tanks, no heavy guns and no air force, and grossly deficient of arms, ammunition, equipment, food, transport and medical services. Hyperpatriotism smacks of Hollywood blurbs but is the only word which seems adequate to describe the inspiration, the glowing spirit of resistance, for freedom of their country, which bound Tito's forces together with an unconquerable strength and unity, such as the country—previously notorious for internal divisions—had never possessed. There is no doubt also that the occasion produced the man in Marshal "Tito" himself. Political hatred and aims, revenge and self-preservation were, and are, subsidiary questions to the NLAJ and their leader, until Yugoslavia shall have been liberated from her enemies. It must be a thought which has occurred to many onlookers of the recent Yugoslav scene that the wanderings and struggles of the NLAJ will provide one more example for history of how invasion and threat of extinction can produce national unity in a country previously divided against itself.

This spirit and the high level of comradeship frequently raised the question by the badly wounded of euthanasia. They did not wish to prejudice the success of the battle and be a nuisance. Such proposals were turned down invariably by the doctors and the entire army.

20 to 30 per cent of the NLAJ were female. Matrimony and pregnancy would have interfered with military necessity and freedom of movement. Marriages were therefore forbidden by Army Orders. The sexes lived, worked and fought together with a complete disregard of sex. I have only heard of one marriage being permitted and that was between a couple who were about to be separated owing to the fact that the man, besides having had a wounded leg amputated, had contracted pulmonary tuberculosis and was to be evacuated by air to a Black Sea Sanatorium.

Similarly, venereal disease would have proved a hindrance to the NLAJ and in any case there were no means of affording treatment. So Army Orders forbade the NLAJ incurring the risk of contracting VD. And the order was obeyed. Amongst the thousands of casualties received in Italy from the NLAJ not a single report of primary VD contracted in Yugoslavia was made.

Innumerable examples of endurance and fortitude amongst the medical staffs could be recited. A few must suffice :—

(a) The stretcher bearers of one divisional hospital (1st Proletarian) within the space of a few weeks carried all their patients, sometimes on their backs, sometimes on stretchers, three times across the great gorge of the River Tara, once across the canyons of the Rivers Piva and Suteska and later across the almost impassable Maglic Mountains. Many of them in consequence had pressure sores extending in depth to the clavicle and acromion.

(b) A well-known surgeon of the NLAJ worked and marched bare-footed for ten weeks in 1943, during which he averaged six operations a day (five without anæsthetics) and 20 miles, being frequently bombed and usually hungry.

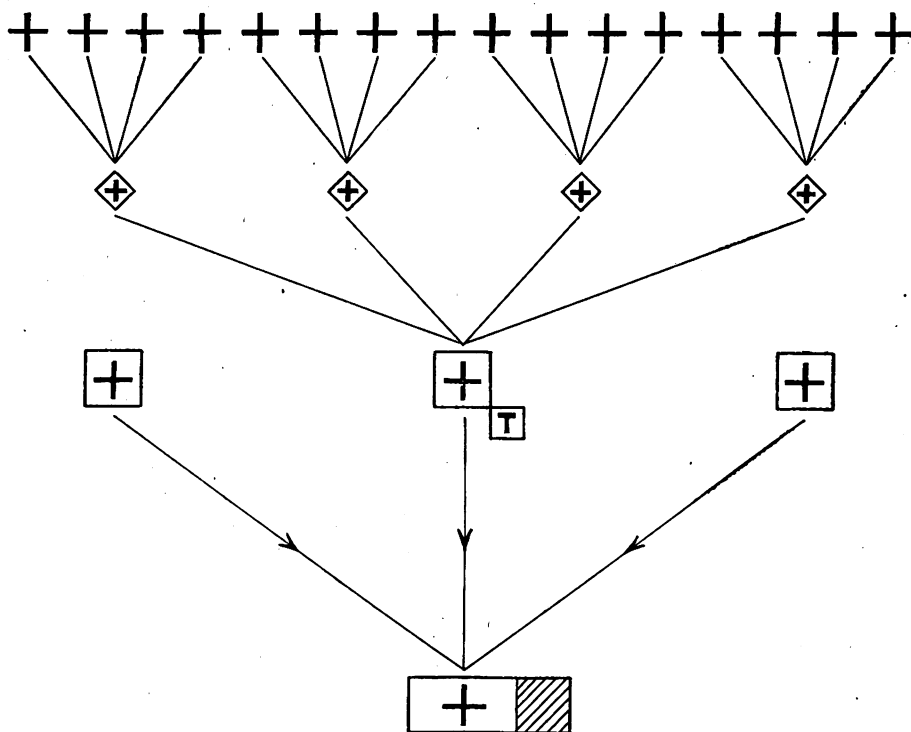
(c) So many idealistic female nursing orderlies were killed succouring the wounded in the front line that orders restricting their ardour had to be issued.

(d) A bath-house with 20 showers was improvised in two hours in a village which had no pump, no running water, no pipes and no coal or oil.

Instances of the same spirit amongst the wounded appear later in this account.



The chain of evacuation for casualties in the NLAJ is shown in the following diagram. It must be pointed out that this organization was not considered ideal, but was dictated by the shortage of medical officers and surgical equipment.



## KEY.



Company aid post (cetna previjalista), male or female nursing orderlies.



Battalion aid post (bataljonska previjalista), with experienced male or female nursing orderlies in charge.




Brigade aid post (brigadna previjalista), with one medical officer.





Divisional Hospital (divizijska bolnica), with 4 or 5 medical officers, divided into medical, surgical, infectious and convalescent departments: differs from usual military hospital by having a large "hospital company" of bearers attached to render it mobile in the absence of any transport or ambulances.



Divisional surgical equipment (divizijska kirurska ekipe), part of which  with a surgical staff is sent forward to brigade level when circumstances necessitate a brigade acting independently or when it is possible for patients to be held at this level.



Brigade hospital (brigadna bolnica), the surgical team of which  carries out triage, holding and treating according to circumstances.  is called "brigadna triazna stanica" and resembles the British F.D.S.

## II.—ITALY.

Towards the end of 1943, the Allies being then in possession of some 250 miles of the Eastern coastline of Italy and having Naval and Air control of the Southern two-thirds of the Adriatic Sea, R.A.M.C. officers were sent to Tito's headquarters to join Brigadier MacLean, Major R. Churchill and others of the Allied Military Mission to the NLAJ. They were able to help by undertaking surgery (especially Major L. S. Rogers) and by arranging more certain methods of ensuring the arrival of essential medical supplies. But at this time of the year good flying days were few, no harbours on the mainland or Dalmatian Islands were free of Germans, and most of the mountainous parts of Yugoslavia—those held by the Partisans—were under deep snow. It was only possible, therefore, during some months of the winter of 1943-44 to render medical aid to the NLAJ by dropping from time to time light-weight supplies from the air and by occasionally running stores in small craft which on the return journey evacuated a few wounded. Until the end of March, 1944, a company of a British Field Ambulance at Grumo Appulia near Bari was capable of caring for all the NLAJ casualties reaching Italy, numbering at the most 300 or 400. As this hospital grew the British staff was reinforced by Yugoslav personnel who were collected in various ways. Some of the doctors who arrived at Grumo were old and unfit, others were women, others were convalescent from wounds or sickness, others were refugees, others released or escaped prisoners of war. Some had been in Italy and elsewhere, some were civilian refugees from Yugoslavia, some had been serving with Tito. Similarly a female nursing staff was got together. This involved the creation of a Nurses' Training School at Grumo to which selected young women, Partisans or civilian refugees, were sent to be trained by the few with previous experience in nursing. A Yugoslav woman doctor directed the training which included general education as well as theoretical and practical nursing. The course lasted four months or more, according to the individual progress made, at the end of which the female nursing orderly was sent into the wards at Grumo, or to the NLAJ at the front (via a NLAJ training centre in Italy), or at a later date to one of the other hospitals admitting NLAJ patients. Selected women and a few men were also given special training at various British hospitals in such subjects as operating theatre work, maxillo-facial, neurosurgical, orthopædic and psychiatric nursing, clinical pathology and radiology. The language difficulties were great; and also the absence of textbooks proved an obstacle until the Partisans' educational bureaux provided cyclostyled translations of English textbooks. This nurses' training school at Grumo proved to be successful in assisting to solve many problems created by shortage of personnel. It is one of the things which it is thought will cause the name of Grumo Military Hospital to become well remembered in Yugoslav history.

(Civilian Yugoslav refugees, men, women and children, often arrived in these early days—and continued for many months to do so—by the same means as NLAJ casualties. Irrespective of whether or not they were wounded or sick, their care was not an R.A.M.C. responsibility. A special department of the Allied Control Commission (AMG) known as the Internees and Displaced-Persons Sub-Commission was nominally responsible. But it happened frequently that distinction between civilians and Partisans was impossible, especially on an airfield at night. Moreover the IDPSC was never staffed to deal with the major surgery required for many of the wounded civilians—usually bomb wounds. In time therefore the military hospitals at Grumo and elsewhere began to contain badly wounded civilians of both sexes and all ages, although not in very large numbers.)

For many weeks at the beginning of 1944, aircraft could not land on the two or three landing grounds available in NLAJ territory. But with the improving weather conditions in April and May, more medical help was immediately forthcoming for the NLAJ. Larger shipments of medical stores, vitamin tablets and food were sent across the Adriatic. The R.A.F. made such excellent evacuation arrangements both in Yugoslavia and Italy, in spite of the continually changing military uncertainty as to the security of the landing grounds in Yugoslavia due to enemy action, that by June, 1944, an average of 100 casualties per night were being evacuated by plane to Italy, of whom roughly 60 per cent were from the NLAJ.

The nightly flow of casualties so received was uneven varying from 18 (one plane load) to 1,060. The R.A.F. pilots had to seize any suitable opportunity which offered to get as many casualties out of Yugoslavia as, and when, they could, although there was an undertaking to limit the numbers to 250 on any one night if possible. When larger numbers were received, sometimes without notice, it was exceptional for the required number of hospital beds to be available immediately. It became, therefore, necessary to establish a semi-medical camp for reception of the casualties not requiring immediate hospitalization and for Partisans who were unfit for any further service as a result of wounds, sickness or age but who did not need further treatment. It must here be remembered that Italy had become the Yugoslav base for the latter type of patient, who was obviously a hindrance to the NLAJ field army. A camp, centred round a small requisitioned village, was established for this purpose with Yugoslav medical officers and a skeleton British administration; it grew until eventually it could accommodate 4,000.

A small British forward base, primarily to serve the needs of the Allied forces assisting the NLAJ, was established early in 1944 on the island of Vis (Lissa). Part of a British Field Ambulance with a surgical team was sent there and at a later date a British Field Hospital landed. These medical units were able to afford considerable help to the NLAJ forces not only on Vis but also to NLAJ casualties from the adjacent islands and mainland.

The NLAJ was immunologically unprotected. The Yugoslav patients arriving in Italy were for the most part dirty, verminous, half-clad in rags and cachectic. Cases of typhus and typhoid fevers were known to be common in Yugoslavia. Outbreaks of these diseases were therefore to be feared in the hospitals and camps in Italy. Arrangements were made that all NLAJ casualties should receive the first dose of typhus vaccine (and also TAB, if fit) and be disinfested within twelve hours of landing. If, in the early days of the transportation of Yugoslav casualties to Italy, it had been realized what numbers this would eventually involve a large disinfestation centre would have been built and a staff provided on the receiving airfield so that the hospitals might have been spared the work. By the time the need for such a central disinfestation centre had been appreciated, it was too late and all receiving hospitals were compelled to make their own disinfesting arrangements with consequent multiplication of equipment, buildings and staff. That the piecemeal measures taken however were successful is shown by the fact that up to the end of August, 1944, no case of typhus amongst the NLAJ casualties arose after the period of incubation had expired. About fifty NLAJ patients developed typhus in hospitals in Italy after air transport, usually eight to ten days after arrival. The transport of the thousands of casualties, almost invariably louse infested, by air from Yugoslavia to an Italian airport and thence by road to hospitals and camps called for great care in the disinfestation of the air and motor ambulances, and of the blankets and stretchers used, and in the protection of the personnel dealing with the transport and reception of the patients. The disinfestation of patients was carried out when possible by hot baths, shaving and the issue of fresh clothes. But this could not be done with the badly wounded whose limbs were encased in plaster under which lice flourished in hundreds. Anti-louse powder (AL 63) insufflated under the edges of the plaster was used at first but was found to irritate and not kill the lice. Later 5 per cent DDT—95 per cent talcum powder—was used in all such cases with great success. Up to the time of writing DDT was unfortunately not available in sufficient amount for use in disinfesting all Yugoslav casualties. If it had been available from the first, the cutting of the female casualties' tresses could have been avoided. British medical units in their disinfesting enthusiasm did not realize the significance of a shorn head in a woman at that time and their methods were decidedly unpopular with the Partisan women.

The air evacuation of the large numbers of casualties from Yugoslavia demanded many more hospital beds for their reception. Several British General Hospitals and Casualty Clearing Stations (and one South African General Hospital) were nominated to receive NLAJ patients. Some admitted NLAJ patients only; others admitted special classes of Yugoslav patients whilst continuing their normal C.M.F. admissions. By the end of August,

1944, approximately 4,000 British Hospital beds were in use for the NLAJ. These were entirely staffed by the R.A.M.C. The units forming this total were in some cases already in Italy; others were brought from Egypt, North Africa and Malta. In addition Grumo Military Hospital had expanded to 1,200 beds, having been given a small R.A.M.C. War Establishment of its own, and had budded off a branch, a 500 bedded sanatorium, for the many cases of pulmonary tuberculosis amongst the Partisans. During August, 1944, a second Yugoslav military hospital of 400 beds was opened; like Grumo Military Hospital this had mainly a NLAJ staff but was administered and assisted by a small R.A.M.C. detachment. Lastly, a 1,000 bedded Yugoslav Convalescent Depot had been established and was attached for administration to a British Convalescent Depot. Although by this time approximately 7,000 beds had been provided for NLAJ patients in Italy, in addition to the semi-medical camp, the pressure for beds was great and it was made greater by the high proportion of "long-term" cases for whom there was no evacuation to an overseas base by hospital ship as for corresponding British or other Allied patients.

Jugoslav medical officers and nursing personnel in Italy were controlled by a Yugoslav Medical Mission who worked in close touch with the R.A.M.C. authorities. 30 to 40 NLAJ medical officers were usually available for posting to the various hospitals and for varying periods of attachment for the study of some speciality or for a refresher course in modern methods. Yugoslav hospital orderlies of all grades reached 350 females (including those at the Grumo Training School) and 450 males by August.

For the R.A.M.C. personnel engaged in working for NLAJ patients the task provided was one which gave satisfaction to all, not only because it was so clearly of great help to the Allied war effort, but also because from the medical standpoint the cases were often of completely different types from those previously encountered in their Army service.

### III.—PATIENTS.

There were many ways in which the medical care of the Yugoslav patients reaching the R.A.M.C. in Italy provided interesting, novel and thought-stimulating problems. Their nature will only be indicated in a general manner here. No doubt much detail will appear from other hands out of the clinical material so abundantly available.

It is probable that the outstanding fact which registers with all medical officers who have treated Yugoslavs is the rapidity with which a seriously ill or wounded Partisan recovers. Once the treatment or operation was over, convalescence was shorter by far than expected. A condition which in a British officer or soldier might be anticipated to lead to a period of six months in hospital and convalescent depot and on light duties at the base or L. of C. frequently recovered completely in a Partisan in half the time. Presumably this was due partly to racial stamina and partly to the Partisan, usually a peasant and a mountaineer by upbringing, having been toughened by months of hard campaigning. An impression that pain was less felt by the NLAJ soldier than the British must also have been recorded by many observers.

(A small Yugoslav motor schooner escaped from the neighbourhood of Split in December, 1943, crammed with civilian refugees and arrived unexpectedly at Manfredonia at night. Amongst the women were five in the last week of pregnancy. One delivered herself on the open deck of the ship during the voyage; another was delivered on the open, snow-covered quay at Manfredonia. At Manfredonia there was no medical unit and no motor ambulance cars. All the refugees were therefore packed into Army "3 tonners" and taken some 60 miles to the nearest IDPSC camp. All the pregnancies were completed successfully; none of the mothers saw any need to stay in bed more than three days.)

Throughout the war the great majority of the R.A.M.C. have treated only men of selected age and fitness. There was an unusual atmosphere, therefore, about the Yugoslav wards where there were almost no age limits and no initial standard of fitness other than ability to march. A scene in one ward is recalled where in three adjoining beds were a company "runner," aged 11, with multiple mortar wounds, a hale old man aged 76 with a comminuted fracture of

the shaft of the femur resulting from burial under a bombed house and an emaciated soldier aged 30 with septic flesh wounds and an R.B.C. count of 990,000. Women's wards were established in all hospitals receiving Jugoslavs; and here again the variety of cases afforded refreshing and extensive clinical experience, including sometimes antenatal and obstetrical work for wounded civilian women refugees. One hospital conducted a small school for children convalescent from wounds, the wife of a Yugoslav doctor acting as school-mistress.

R.A.M.C. surgeons overseas do not as a rule see a great deal of major chronic sepsis. The few cases that do arise in British patients are "long-term" cases and are evacuated as soon as they are fit to travel for treatment by surgeons in the U.K. Delays in obtaining skilled surgical assistance together with all the other factors of warfare in Yugoslavia produced many cases of chronic osteomyelitis in the hospitals in Italy. As already explained these hospitals had to hold and treat these "long-term" cases, usually for several months. Lardaceous disease had sometimes commenced. Treatment gave only slow and often disappointing results; penicillin was useless in these cases except as a prophylactic immediately before and after the frequently inevitable amputation. Nevertheless well-planned drainage, good food, careful dressing and nursing did produce, surprisingly often, successful results with these tough soldiers—after months of purulent discharge and sequestration. At one period at Grumo Military Hospital sequestrectomy was much the most common operation entered in the operating theatre record book. Gas gangrene was very rarely seen.

One patient, whose leg was saved, had a suppurating compound fracture of the head of the tibia with retained foreign body sustained three months before arrival in Italy. During this time with inadequate fixation by improvised wooden splints he had ridden hundreds of miles on muleback with a small isolated and much harried detachment. His comrades built a platform on to the saddle so that his foot was alongside the mule's eye. At other times he used a sling and crutches. R.A.M.C. reserves of Balkan beams and crutches, usually more than sufficient, were unable for some weeks in 1944 to meet the demands for Yugoslav patients, and recourse was had to local manufacture by the R.E.

The large number of amputations for wounds and chronic sepsis introduced new problems for the R.A.M.C. by necessitating the provision in Italy of artificial limbs for Partisans, who unlike other Allied "amputees" could not be sent for the supply of prosthesis and subsequent rehabilitation to a home base. Two factors determined the action taken. The first factor which had to be considered was the high proportion of emergency amputations performed in Yugoslavia in which the operation had not been done at the site of election and which would therefore require re-amputation later. Secondly time was important; the constant pressure for beds in hospitals and convalescent depot required that the leg amputee be supplied with a prosthesis with which he could be discharged to a useful life in a non-medical unit as soon as possible. The supply of modern type artificial limbs, even if it had been possible, would have been wasteful and time-consuming. The Consultant Surgeon, A.F.H.Q., therefore, arranged that a small limb-making centre, with British and Yugoslav personnel, should be established to make and fit simple wooden peg-legs with leather and metal buckets and webbing straps, aiming at an output of one per diem. The order was a "tall" one; at one time there were more than 100 Yugoslav personnel awaiting the supply of an artificial leg. The supply of artificial arms and hands was not undertaken unless both hands had been lost. This limb-making centre was established at the Yugoslav Convalescent Depot where the amputees were collected and where the limb fitting and rehabilitation could be supervised by the Specialist in Physical Medicine and the visiting Orthopaedic Surgeon of the adjacent British Convalescent Depot.

The physicians were not less well provided with interest than the surgeons. Almost every surgical case amongst the NLAJ was also in fact a medical one by reason of the clinical manifestations—skin, digestive and nervous—of undernutrition and hypovitaminosis. The half-starved wounded Partisans on admission to our hospitals at first found the change to a British diet frequently not altogether to their liking. But they could, and did, eat bread

in enormous amounts without apparent discomfort or ill-effects. To meet their need authority was given for the normal British Army ration of 14 ounces of bread per diem to be increased to 20 ounces for Yugoslav patients. For many days after admission it was common to see them with a permanent axillary attachment of a loaf of bread. A result of this voracious appetite and rapid regaining of weight which was occasionally seen was the appearance in an acute form of an unsuspected disease, previously present though suppressed or ambulatory. Such patients, in bed, emaciated and with subnormal temperatures, suddenly developed signs of second and third week typhoid or paratyphoid fever, or a severe dysenteric hæmorrhage. They caused much anxiety to the medical staffs owing to the absence of prodromata and kept the pathologists needlessly busy for a few days searching for sources of infection among the innocent staff and other patients in the ward. It was quite useless to attempt to curb the appetite of the freshly arrived Yugoslav patient—the Partisan in a British Hospital had his own ideas as to what orders he should obey—but fortunately serious results from overeating were comparatively few. It may be emphasized at this point that the Yugoslav patient reaching Italy was relatively immune to the ordinary infectious diseases. Typhoid, paratyphoid, typhus, bacillary and amœbic dysentery, malaria, kala-azar and infective hepatitis were occasionally encountered, but, with the exception of pulmonary tuberculosis, others were rare. This was particularly noticeable in the case of diphtheria by contrast with its common occurrence in British troops. There is no doubt that the hygiene sections of the NLAJ did excellent work in diminishing intestinal infections which in pre-war days had been endemic in many parts of Yugoslavia.

Pulmonary tuberculosis, however, was a different story. In this case the R.A.M.C. was not in ignorance of existing conditions and what to expect. For many years before the war mortality and morbidity from pulmonary tuberculosis in Yugoslavia had been notoriously heavy. The figure of 150,000 to 200,000 cases of active pulmonary tuberculosis in Yugoslavia in 1939 has been given by one Yugoslav doctor. Before the invasion of Italy many cases of tuberculosis amongst Yugoslav refugees in Egypt and North Africa had been diagnosed and by March, 1944, some fifty such patients had been collected in a hospital in Malta. Before large-scale air evacuation of NLAJ casualties to Italy commenced, Marshal Tito's Headquarters informed the R.A.M.C. that at least 250 cases of pulmonary tuberculosis were awaiting evacuation. It was apparent that a special hospital would be required for this disease. A suitable and conveniently situated site was not easily found in S.E. Italy, nor was an existing Italian sanatorium available. Eventually a large village elementary school with additional tented wards for ambulant cases was converted into a "makeshift" sanatorium for Yugoslavs. Two able Yugoslav doctors (Niebauer and Janovic) were available as senior medical officers and they, with other Yugoslav medical assistance and with a small British administrative staff, conducted a 500 bedded Sanatorium—for pulmonary tuberculosis only—with surgical, X-ray, and APT facilities, which proved invaluable. The patients from Malta were transferred to this sanatorium and, at the time of writing, some 500 other Yugoslavs were being treated or had been discharged on surveillance. Many of those admitted were hopelessly ill on arrival and it is too early to write of results in the others, but it is encouraging to note that 72 fresh APT inductions were performed in the first two months of the sanatorium's foundation. The differential diagnosis between starvation and active pulmonary tuberculosis was frequently difficult and required lengthy observation. It was noted that Yugoslav doctors attach more importance to the regular administration of large doses of calcium, intramuscularly or intravenously, and to the altitude of their sanatoria than does current British medical opinion.

In spite of the published statements to the effect that the enemy had deliberately mutilated or tortured Yugoslav soldiers and civilians only one doubtful case (burns of the soles of both feet) of anything of the kind was reported from the hospitals in Italy. This cannot be accepted as conclusive—dead men tell no tales—but no evidence to justify the accusation that such things were being done in 1944 was gathered. Perhaps the writing on the German wall had been seen by this time.

Psychiatric patients figured amongst the NLAJ' casualties in the same ratio as amongst other Allies, but it was noteworthy that the diagnosis as between an organic and a psychogenic condition was very seldom made difficult by camouflage, as indeed was to be expected in dealing with the straightforward, uninhibited Partisan.

The Jugoslavs were grateful, cheerful, co-operative and often singing (their "Literature of Escape") patients to whom the R.A.M.C. responded by giving of their best and by accepting additional work. One characteristic of the NLAJ patient at all times of the day, whether in bed or not, was the verbal greeting given to all: and it is fitting that this word, which may be freely translated as meaning "Hail! Fellow, well met," shall conclude this article, as a tribute from the R.A.M.C. to the NLAJ—"ZDRAVO."

For much information and assistance in the writing of this article, I wish to thank Lieutenant-Colonels N. Nikolic and A. Papo of the NLAJ and Lieutenant-Colonel N. G. G. Talbot, R.A.M.C. Some use has been made of the statistics given in an address by R. Bicanic, published in the *Geographical Journal*, vol. ciii, January-February, 1944.

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## THE SHAPE OF THINGS TO COME.

By R. E. B.

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THE tremendous events of 1944 have driven home many lessons of high importance to the Medical Services of the Armed Forces. Very often, during these anxious months, officers must have got up from the Conference Table with a feeling that inter-Service barriers were being broken down which should never be replaced.

Every war of the future will be a combined operation in the sense that more than one Service will be implicated and it is well to remind ourselves that the majority of clinical and administrative medical problems are common to us all.

Such being the case, it would surely be most desirable to evolve some system under which the wounded sailor, soldier or airman fits into the same medical administrative framework.

A consideration of this problem can be based on three postulates. The first one is that sailors, soldiers or airmen should be admitted into the nearest or most convenient Service hospital without discrimination. Secondly, that, if our first postulate is granted, a great increase in efficiency and an appreciable saving in work and man-power would result from a unification of the general medical administrative procedure.

The first of these postulates is almost axiomatic. In peacetime abroad the Army undertook the largest share in admitting men of all three Services, but at home, it sometimes happened that, for example, a fully equipped hospital at a Naval Base lay near to a smaller Military Establishment, with a consequent duplication of Staff and Special Departments. Most of this discrimination ceased when the tide of wounded began to flow from the Normandy Beaches and soldiers were admitted, and are still being admitted, as they arrive by air or sea into the hospitals of our sister Services.

The second postulate is one calculated to open the door to wider reforms. No inherent difference between the temperatures of sailors, soldiers or airmen demands that they should not be recorded on the same chart and so, by easy stages, we are led to consider the possibility of producing uniform Case Sheets, Diet Sheets, Invaliding Documents, Field Medical Cards and Casualty Labels, etc. Be it noted that, to-day, if a soldier is brought back by air, a special R.A.F. label, in triplicate, is tied on to him; if he returns by sea, a different label, also in triplicate, is used, although the purpose of the two systems is identical.

If, then, we grant our first two postulates, we are driven to the following conclusion; either all three systems are equally good—in which case it does not matter which is selected; or that some points in one system are better than the others—in which case a representative committee would select the best features of each; or, that they are all equally bad—in which case it should not be beyond the wit of all three Services to effect an improvement.

From this point the evolution of a common system of indenting is a short step and it is difficult to believe that the establishment of common depots, staffed by representatives of all three Services, would not make for economy and efficiency. In this way, the Services would gradually begin to talk in the same language and would be prepared to consider the third postulate—that the free intermingling of Medical and Nursing Officers would contribute to a higher state of efficiency and to a saving of medical man and woman power.

It is possible to visualize the formation of a great Imperial Medical Service which shall watch over the health of all our fighting men.

Let us at once banish the idea that such a Service must necessarily consist of a batch of doctors wearing some nondescript kind of uniform and not forming part of the particular arm which they are working. In our Corps, we are deeply sensible of the fact that we form an integral and essential part of the Army and have the same responsibility to the men serving



under us as any other Corps. It is devoutly to be hoped that no changes will be introduced which would tend to lower the prestige of the Corps to whose traditions we are proud to owe allegiance ; but it should surely be possible to draw up uniform conditions of service equally applicable to Medical and Nursing Officers of the Navy, Army and Air Force. Under such an arrangement all matters of pay, pension, promotion to corresponding rank and terms of service generally would be the same. Different forms of specialist knowledge are, of course, required in each Service, but it should not be difficult to adjust these questions by making separate specialist appointments with a uniform rate of Specialist's pay.

Under such a scheme, interchange of officers, and especially of Consultants and Specialists, would become a commonplace and a mixture of blue and gold, khaki, and Air Force blue around the tables of our Hospital Messes would be no novelty. After all, it is no great matter whether the arm which wields the scalpel has rings round the sleeve or crowns and stars on the shoulder ; and there must be considerable overlapping of Consultants and Specialists in this country, where the parish of an Army Consultant may embrace half of England, while another of equal distinction in another Service may be within a few miles of where his services are required.

Such co-operation between the Services does not in any way violate the established principle that each Service, and, indeed, each unit, must have its clearly defined limits of responsibility. It is vitally important, however, that these limits shall not be in the nature of a fence which takes some getting over—still less of a brick wall, which not only obstructs movement, but also prevents one from seeing what the other fellow is doing. Our limits should be marked, as it were, with the clear white line of the road or car park which does not hide the general picture and presents no sort of obstruction to our crossing the line to give or receive help whenever or wherever it may be required.

Over the whole of this wide Service organization would be a great triumvirate, our three Directors-General advising the Admiralty, the War Office or the Air Ministry, each one acting in rotation as the representative Director-General, who would be the mouth-piece of the Imperial Medical Service to the War Cabinet.

Peering further into the mists of the future, one can see the outlines of an Imperial College of War Medicine taking shape ; a College at which all doctors of the fighting Services would be able to study and live together.

The fundamental subjects of Medicine, Surgery, Pathology, Anæsthetics, etc., are common to all of us and specialized courses would be held in subjects particularly applicable to any one Service. The value of such a College would be greatly enhanced by the presence of Medical Officers of the fighting Services from the Dominions.

When one considers the shape of things to come in our profession, it is tempting to stray still further along the by-ways of conjecture.

The Service Medical Officers of the Russian Army are taken straight from the schoolroom and trained for their future in a Military College, the value of whose Medical Degree is unsurpassed in the Soviet Union. Also be it noted, young officers of the Royal Engineers and the Royal Signals are already being trained at public expense as undergraduates at Oxford and Cambridge.

We read much to-day of a State Medical Service and of proposals that the State should give medical training to selected boys on leaving school, and many young men wishing to take up medicine to-day must be looking to the future with doubt and bewilderment. The establishment of an Imperial Medical Service for all the Armed Forces of the Crown would no doubt attract the best type of student by the prospect of a first-class medical education, followed by a career in a Service, be it Naval, Military or Royal Air Force, which has already a high tradition of skill and devotion and one free from the hurly burly of medical politics, which will embarrass our profession for many years to come.

To stimulate constructive criticism we print the following outline of the Constitution, Purpose and Scope of a College of War Medicine. This has the blessing of the writer of the foregoing article but its authorship remains equally anonymous. It must be remembered that these are personal views and the *Journal* cannot commit itself to the enunciation of any political policy.

Over two thousand years ago it was written, "Your old men shall dream dreams, your young men shall see visions."

This College may not be a dream but a vision to be brought to reality before now greying heads are laid low.

### THE IMPERIAL COLLEGE OF WAR MEDICINE FOR THE ARMED FORCES OF THE CROWN.

For Medical Officers of The Royal Navy, The Army, The Royal Air Force, The Armed Forces of The Dominions and Officers of The Indian Army Medical Corps.

#### ADVISORY COUNCIL.

A President who shall be a Cabinet Appointment. One representative from each Service, either Retired or on the Active List.

One representative from the Royal College of Physicians and the Royal College of Surgeons. A representative of the General Staff. All to be appointed for a specific term.

#### DIRECTIVE COUNCIL.

A Commandant and Director of Studies to be appointed in rotation from the Royal Navy, the Army and the Royal Air Force. The Professors of Surgery, Medicine, Hygiene, Pathology, Psychiatry, Biological Research and Staff Co-ordination.

#### DEPARTMENTS.

- (1) Surgery—to include specialist branches.
- (2) Medicine—general and tropical.
- (3) Hygiene—general hygiene with stress on service and tropical aspects.
- (4) Pathology—to include bacteriology and entomology.
- (5) Psychiatry—preventive, selective and curative. To work in close relationship with the Hygiene Department. May be divided into two sub-divisions: (a) Mental hygiene, (b) Clinical psychiatry.
- (6) Biological Research—to include general research as well as the special problems arising in each Service.
- (7) Staff and Co-ordination.

The Directive Council to have power to co-opt the heads of Specialist subdivisions, e.g. Orthopædic Surgeon, Radiologist, Anæsthetist, etc., when their special subjects are under discussion. To have them all as permanent members of the Directive Council would make that body too large and unwieldy.

#### TEACHING STAFF.

Professors, Assistant Professors and Demonstrators for the main subjects. The heads of sub-departments to rank as Assistant Professors which title is preferable to "lecturers." These to be appointed by the Directive Council on merit irrespective of in which branch of the Service they may be serving.

#### COURSES.

- (1) Junior—on entry to a Service.
- (2) Senior—on promotion to Major or equivalent rank or after a specified period of service, e.g. five or seven years.
- (3) Special—in special subjects.
- (4) Refresher—short courses after tours of service abroad to include recent advances and discoveries.
- (5) Medical Staff and Co-operative Co-ordination—an Annual Course for selected officers—may be attended by officers of the General Staff, some of whom should be lecturers. The Professor may, indeed, be a General Staff officer.

## DIPLOMA.

There should be a Diploma of War Medicine (D.W.M.). This should include the subjects in the Senior Course and the Staff and Co-ordination course. No officer should hold any responsible administrative appointment in Peace or War unless he holds this Diploma. It would correspond, roughly, to the *p.s.c.*

It may be said that this sets a very high standard ; well, why not ?

## RESEARCH.

The Research Staff to consist of selected officers from all the Services and to be so directed as to afford facilities for research into the special problems affecting each Service.

## LIAISON.

The following will require consideration :—

Relationship to (a) The Royal Colleges of Medicine and Surgery ; (b) The University of London ; (c) The London School of Hygiene and Tropical Medicine. These are given as examples.

## FINANCE.

A special grant from the Treasury is suggested.

## LOCATION.

London appears the only possible location for such a College but special Royal Navy and Air Force courses may be held elsewhere. The choice of buildings depends upon the acceptance of the general principles of the scheme.

## SERVICE EQUIPMENT.

There should be a special advisory committee to ensure that all medical and surgical equipment is standardized and interchangeable throughout the Services. This should cover all Service medical documentation.

## CLINICAL SIDE.

It is essential that hospital accommodation for adequate clinical teaching is available. The ideal would be a hospital in London to admit cases from all the Services. It could be called, say, "The Churchill Hospital" which title would be preferable to "United Forces Hospital." This Hospital should have the same relationship to the Imperial College as has the present Queen Alexandra Military Hospital to the Royal Army Medical College or a London Hospital to its attached Medical School.

## THE ARMY DENTAL CORPS.

Any such scheme must include The Army Dental Corps.

## NURSING SERVICES.

Refresher and Specialized courses for these Services should be included.

## MENISCECTOMY IN THE SOLDIER.

By Major R. S. GARDEN,

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*Officer Commanding an Orthopædic Centre.*

[Received September 5, 1944.]

THE treatment of knee-joint disabilities constitutes a problem of no small importance in the present war. In one Orthopædic Centre alone, over a twelve-month period, 628 patients were dealt with who had been referred for treatment of "internal derangement of the knee." Of this number, 325 were considered to have true semilunar cartilage injuries, and, of these, 206 came to operation. This article is based on such observations as were made in the management of these cases, and the methods of diagnosis and treatment which were adopted are described.

### GENERAL CONSIDERATIONS.

A far greater proportion of semilunar cartilage injuries require operation in the Army than in everyday life. This follows from the fact that symptoms depend largely on individual activity. The professional footballer regards a cartilage injury as a serious disability, whereas the same lesion may be little more than a minor inconvenience to the sedentary worker. The latter may be forced to discontinue taking part in vigorous games because of "the knee which lets him down," but otherwise his disability may be soon forgotten. When such an individual enters the Services, however, choice of activity is no longer his own. The knee is subjected to strains and stresses which quickly reveal the latent cartilage lesion and confidence in the affected joint is lost. A large percentage of Army patients who come for treatment of knee-joint disabilities are in this category and a history of initial injury which took place five or ten years previously is not uncommon.

Meniscectomy in the soldier is undertaken with a view to preserving or increasing efficiency. It cannot be expected to succeed in the presence of gross arthritis or ligamentous damage nor is it likely to be of benefit when the diagnosis is at fault. Persistence of symptoms, following operation, is to be avoided for many reasons. In addition to the crippling of the individual's services, such an end-result will discourage more suitable patients from seeking treatment, and interference with the efficiency of many men will follow.

The decision to remove a semilunar cartilage, therefore, requires careful consideration of the case from every aspect. Accuracy of diagnosis, particularly, should be sought, since the operation of meniscectomy cannot always be relied upon to establish this. No more than the anterior half of the cartilage is seen on opening the joint, except in the case of centrally displaced "bucket-handle" tears. In lesions of the posterior half, the cartilage may appear completely normal until its removal is actually in progress. It is more profitable to be sure of the diagnosis than to employ an extensive, and perhaps damaging, incision in order to examine the joint interior.

### DIAGNOSIS.

Diagnosis is based on a combination of the history and clinical findings. The patient is invited to tell his own story. Suggestion of the word "locking" is best avoided for the soldier will almost always agree that this has taken place on one or other occasion. He cannot be expected to appreciate the mechanism of locking, and the term simply appeals to him as a convenient way of describing any stiffness or painful motion which he may have experienced. If true locking has taken place, this will be evident from the patient's statements without the need for prompting.

The typical history is one of initial injury of the abduction-rotation type, which is accom-

panied by pain of a sickening character and followed some hours later by swelling. Swelling which appears immediately after the injury is interpreted as indicating a hæmarthrosis. Locking is characteristic, as is the sudden unlocking which follows. The subsequent history is a repetition of this cycle of trauma, pain, locking, unlocking and swelling. As time goes on, the disability is noted after even minor trauma, and the patient becomes adept at unlocking the joint by his own efforts. Swelling tends to diminish with each successive attack, and in a case of some years' standing it may not appear at all.

In cartilage cyst formation, the common complaint is one of constant ache, worse at night, and the site of this ache is frequently indicated by a vague rubbing of the open hand over the affected side of the knee.

Although the history is not always straightforward, much can be gleaned from it as a rule and the clinical examination which follows is often required for confirmation only. Examination is carried out with the patient lying down and *both* legs uncovered. Inspection reveals the presence of wasting, swelling, thickening of the synovial membrane or cyst formation.

The range of active movement is examined by asking the patient to flex and extend the knee. A hand placed on the joint whilst this is being done will detect any osteo-arthritic crepitation which may be present. This crepitation is more easily recognized during active than passive movement and tends to be masked by a synovial effusion.

The integrity of the lateral and cruciate ligaments is examined by testing for lateral stability with the knee straight, and for antero-posterior mobility with the knee flexed to a right angle. Reference to the opposite limb is made whenever abnormal laxity is suspected.

With the knee still flexed to a right angle, points of tenderness are sought at the attachments of the lateral ligaments and along the line of the joint itself. A strain of the internal lateral ligament is denoted by a point of tenderness which is almost always at its femoral attachment. A tear of the internal cartilage from this ligament is indicated by a point of tenderness over the line of the joint.

By this routine, a general impression is obtained of the knee under examination. In the presence of ligamentous injury, arthritis, chronic synovial or infrapatellar pad thickening, treatment is directed accordingly. If, on the other hand, no abnormality is discovered apart from quadriceps wasting, synovial effusion or joint-line tenderness, further investigation is required. Joint-line tenderness, by itself, is not accepted as conclusive evidence of a cartilage injury. Manipulation of the knee, according to the method of M'Murray, is of particular value at this stage of the examination. A positive finding with this test places the diagnosis beyond doubt and frequently indicates the nature of the lesion itself. It cannot be carried out, however, in the acute phase of a meniscus injury when full flexion is prevented by swelling or pain.

To perform this manipulation, the patient must lie comfortably and relaxed. The examiner stands on the same side as the affected limb and grasps the patient's heel with one hand whilst the thumb and index finger of the other encircle the line of the joint. The internal cartilage then underlies the index finger and the external cartilage is covered by the thumb.

The purpose of the manipulation is to manœuvre any loose cartilage or tag between the femur and tibia. This is achieved, essentially, by reproducing the mechanism of injury. In the case of a suspected internal meniscus injury, the knee is fully flexed, the tibia forcibly rotated externally and the internal lateral ligament is put on the stretch by abducting the leg. The internal cartilage is thus strained at all its attachments and pulled towards the centre of the joint. If the leg is now slowly extended, the internal femoral condyle will slip across any loose cartilage fragment and will be both felt and heard to impinge on the head of the tibia. The resulting sensation of touch and sound is unmistakable, and the patient often volunteers the information that his feeling of "giving-way" has been reproduced.

The nature of the lesion is indicated by the stage of extension at which this slip occurs. In full flexion, the injury is likely to be a posterior one. In mid-flexion, a central tear is

suspected and a slip occurring both in flexion and extension indicates a double lesion or "bucket-handle" tear.

When an external cartilage is to be examined, the same manipulation is carried out with the tibia internally rotated and the knee adducted.

X-ray examination is a necessary routine. It provides a check on such conditions as osteochondritis dissecans, osteo-arthritis, loose-body formation or abnormal calcification.

Should a cartilage injury be discovered, the question of operation is considered when a general appraisal of the case has been made. Such factors as age, attitude, general condition, associated lesions and present medical category are all taken into account. Meniscectomy is felt to be justified when the diagnosis is clear, the symptoms are sufficiently troublesome to warrant operation and no other factor is present which will negative the end-result. When two abnormal conditions are discovered in the same joint, individual judgment must decide whether the symptoms are due to one or both of these conditions—a decision not always easy to make. On the other hand, operation is advocated in those cases where dislocation of the cartilage frequently recurs—even in the absence of serious disability. This type of derangement, because of the repeated trauma, will almost certainly lead to osteo-arthritis which will be unlikely to respond to meniscectomy performed at a later date.

A number of knee-joint disabilities defy diagnosis when first seen, and these are given a course of provocative exercises before a final decision is made. The M'Murray test, performed under general anaesthesia, can be of much value in a doubtful case.

#### ANÆSTHESIA.

Omnopon-scopolamine premedication with intravenous pentothal has proved ideal for meniscectomy. The following technique was devised by Major T. F. Crowley, R.A.M.C., and is now exclusively employed. The limb is elevated for three minutes and an intravenous injection of approximately 0.4 gram of pentothal is given. The tourniquet is then applied, and, when the operation field has been prepared and the surgeon is ready to begin, a further injection of 0.4 gram of pentothal is administered. As the operation proceeds, additional small amounts of the anaesthetic are given as required, and a total dosage of 1.2 grams of pentothal is seldom exceeded before the completion of the operation.

#### OPERATION.

Simplicity of technique, coupled with scrupulous asepsis, is regarded as the keynote of meniscectomy. A two-day preparation of the limb from toes to groin is carried out, and all contact with septic cases is avoided. The number of instruments to be used is reduced to a minimum and, scalpels included, these are sterilized by boiling and transferred to the instrument tray just before use. A tourniquet is routine—but not indispensable—and the non-touch technique is always employed.

A piece of fine muslin, soaked in spirit, is used to cover the knee, and the leg is allowed to hang over the end of the table. A sandbag, carefully positioned behind the knee, forces the head of the tibia forwards and brings more of the cartilage into view when the joint is opened. This sandbag is judged to be correctly placed when the leg hangs with the knee at an angle of 80 degrees.

The incision is made slightly obliquely from within outwards over the anterior joint-line, and midway between the lateral ligament and the edge of the patellar tendon. The inner joint-line is always identifiable and can be used as a guide to the outer joint-line which is frequently obscure. The incision is made through the muslin which does not gape in the line of the incision as does the skin itself. No skin, therefore, is exposed.

Length of incision depends on accurate diagnosis. When the operation is approached with the definite object of removing the cartilage, and not for the purpose of examining the joint interior, an incision of one and a half inches is adequate. This is important, since any procedure which involves division of the synovial membrane must, of necessity, inflict

a traumatic synovitis on the joint. The more extensive the incision, therefore, the greater is the reaction likely to be.

On opening the joint, smooth, narrow Langenbeck retractors are inserted, and a blunt hook is slipped under the free margin of the anterior half of the cartilage. The point of this hook appears at the line of cleavage between cartilage and head of tibia. A scalpel is inserted horizontally at this point and the cartilage is divided from its anterior attachments to the tibia. As the anterior horn is cut through, the scalpel is directed vertically in order to avoid damage to the anterior cruciate ligament. The blunt hook then slips out, and the meniscus is firmly grasped in a cartilage clamp.

A hand-lamp, held behind the operator, illuminates the joint interior, and the cartilage is freed by vertical strokes of the scalpel back to, and from, the lateral ligament. Central displacement of the cartilage is now possible. The weak posterior coronary ligaments are torn through by forcing the meniscus centrally. The whole cartilage dislocates into the intercondylar fossa and the posterior half comes into view. A side-to-side movement is then imparted to the meniscus and a stout tenotomy knife is held against the posterior horn. In this way, the posterior horn tends to divide itself against the blade of the knife and damage to the articular cartilage at the back of the joint is avoided.

Throughout the operation, the anterior half of the cartilage—itsself easily found and removed—is regarded as the instrument whereby purchase is obtained on the posterior portion and the latter brought into view by central displacement. Great care is therefore taken to conserve this anterior half and to avoid its separation from the rest of the cartilage. Should this occur, a posterior incision becomes necessary to remove the posterior horn, and the operation is needlessly complicated.

In actual practice, the meniscus does not require separation from all its attachments at operation. Much of this has already been done by the injury. In those cases where the posterior horn has been torn from its peripheral attachments, central displacement is automatic as soon as the anterior half has been freed. In "bucket-handle" injuries, the whole cartilage may be found lying in the intercondylar fossa when the joint is opened. Meniscectomy then consists simply of division of anterior and posterior horns. More usually, however, a thin peripheral rim remains, and this should be carefully removed along with the central portion.

Cysts of the meniscus are normally dealt with by ordinary meniscectomy. The cyst itself is ignored but is entered as the meniscectomy proceeds—the escape of clear jelly-like cyst contents showing when this has taken place. With removal of the cyst origin, i.e. the cartilage itself, recurrence is less likely to occur than if the cyst alone is removed.

As few instruments as possible are allowed to enter the joint during the operation, and nothing is traumatized by forceps which is not to be excised. The leg is straightened to 45 degrees of flexion and a single strand of plain catgut is used to close, first the synovia and then the capsule. A running mattress suture everts the edges of the synovial membrane and leaves a smooth inner surface to the suture line with no inwardly-projecting tags. For this purpose, the Cole double-ended needle is useful. It requires a simple back-and-forth movement, well suited to the non-touch technique. No knot, or half knot, is tied until the closure of both layers is complete, as otherwise a firm, hæmostatic suture may not be obtained. Careful co-action of the skin edges with silkworm or linen thread is followed by a dressing of dry gauze and the leg is straightened. A firm compression bandage is applied over a liberal amount of cotton-wool, and the tourniquet is then removed.

#### AFTER-TREATMENT.

Much importance is attached to the after-treatment. This is concerned mainly with the maintenance of functional activity in the quadriceps muscle, and is necessary to ensure adequate control when the patient is allowed to get up. In addition, it preserves the action of the subcrureus muscle in tensing the loose synovial structures in front of the knee. A

weakened subcrureus allows nipping of these structures between the femur and tibia when the knee is extended. This, in turn, leads to recurrent synovitis with hæmorrhage and resulting fibrosis in the infrapatellar fatty pad.

When the quadriceps muscle is allowed to remain idle, wasting, particularly of the vastus internus, follows with astonishing rapidity, and a long period of re-education is required to restore its activity. In meniscectomy, preservation of muscle tone is aimed at, and as few opportunities as possible are afforded for wasting to occur. This demands complete co-operation on the part of the patient, who must be able to perform quadriceps exercises almost as soon as he has recovered from the anæsthetic. These exercises, moreover, require to be continued at frequent intervals until normal activity is resumed.

Such a regime is undoubtedly tedious and can have but small appeal to the average soldier. He neither finds it easy to perform isolated quadriceps contractions nor to understand why these should be required. Much is to be gained by explaining the purpose of those exercises to the individual patient and by segregating all such patients in the same ward. If a competitive spirit can be fostered so much the better. In this respect, an accurate check on the number of quadriceps contractions carried out can be obtained by attaching an ordinary mechanical tally-counter to the heel of a slipper which the patients can wear in turn throughout the day. Each elevation of the leg is recorded automatically, and the patients soon come to vie with each other in trying to achieve the largest number of contractions. In addition, sustained quadriceps contracture against resistance goes far to restoring confidence in the limb. Faradism is never employed.

The sutures are removed on the tenth day and the patient is then allowed to get up. No splint is used, for the joint is better controlled by active muscle power than by any form of artificial splintage. All reaction from the operation has now passed off and the patient quickly regains full movements by his own efforts. A course of weight-bearing exercises is then begun. These exercises are carefully graduated according to the joint response. Individual attention is imperative at this stage and any tendency to "class" instruction is discouraged.

Full movements with an efficient quadriceps and no synovitis is the rule three to four weeks after operation, and this is considered as the criterion of fitness for the final stage of "hardening." This stage is best carried out in a convalescent depot where general and specialized physical training are available under the guidance of a qualified instructor. If such facilities cannot be obtained, the patient is retained in hospital for a further few weeks before being returned to duty. Premature discharge of a patient following meniscectomy is seldom worth while.

There can be no hard and fast rule as to when full duty should be resumed. Each case must be judged on its own merits for there are seldom two patients who behave alike. The reaction to meniscectomy in an old-standing injury, for example, is trivial as compared with the persistent effusion which may follow the removal of a recently injured cartilage. Again, the length of time required to rehabilitate a patient after meniscectomy is much longer in the Army than in civil practice. The soldier must be fit to undertake whatever duties may be demanded of him when he returns to his unit, for he cannot absent himself at will as can the civilian. It should be unnecessary to impress upon him, on discharge, that he must continue to do his exercises by himself. He should long since have passed the stage of conscious quadriceps contraction before being considered for discharge.

It was the custom at one time to down-grade for a period of three months all patients who had undergone meniscectomy. This was intended as a precaution against too early participation in an assault course. Down-grading is no longer carried out, however, as there are excellent post-operative routines now available which re-introduce the patient to intensive training stage by stage. Any suggestion that the soldier must continue to "nurse" his knee after he has returned to duty may do much harm by fostering the thought that all is not yet well; and in this way the whole purpose of his treatment may be destroyed.



Of the 325 patients who were considered to have true meniscus lesions, operation was found inadvisable in 119 cases for the following reasons:—

First offence—recent injury with apparent recovery .. .. .	27
Disability not sufficiently marked to warrant operative treatment .. .. .	35
Osteo-arthritis, ligamentous damage, chronic synovial thickening .. .. .	38
Dermatitis, malaria, dysentery, etc. .. .. .	15
Refused operation .. .. .	4

The following operations were performed in 206 cases:—

Right internal meniscectomy .. .. .	81
Left internal meniscectomy .. .. .	73
Right external meniscectomy .. .. .	19
Left external meniscectomy .. .. .	33

(17 external meniscectomies were carried out for cartilage cysts. Of these, 15 were on the left and 2 on the right knee.)

Osteochondritis dissecans was encountered at operation on five occasions.

In a personal series of 100 consecutive cases 45 gave a history of initial injury at football. The remainder described a wide variety of initial injury.

- 10 sustained the initial injury less than a month before operation.
- 19 sustained the initial injury within the previous six months.
- 24 sustained the initial injury within the previous two years.
- 18 sustained the initial injury from two to ten years previously.
- 17 could not remember when they first had "knee trouble," and
- 12 stated that the disability "just came on."

64 gave a history of locking, and, in 31, synovitis with poorly developed quadriceps were present when the patients were first seen. Some degree of quadriceps wasting was noted in practically every case.

Operative findings were:—

Bucket-handle tear .. .. .	33
Loose posterior half .. .. .	31
Whole meniscus torn from peripheral attachment .. .. .	7
Loose posterior half with secondary longitudinal split .. .. .	4
Loose anterior half .. .. .	4
Torn at centre and requiring posterior incision for removal of post. horn... .. .	3
Pedunculated .. .. .	5
Congenital discoid—all external .. .. .	6
Cyst of meniscus—all external .. .. .	5
No abnormality found .. .. .	2

Thirteen were returned to full duty direct from hospital within the first five weeks following operation and 10 during the succeeding five weeks. 57 were transferred to a convalescent depot within the first five weeks following operation and 20 between the fifth and eighth weeks.

Post-operative effusions were occasionally troublesome, but no other complications were encountered although the operations were performed during hot weather under conditions which were by no means ideal.

#### CONCLUSIONS.

Semilunar cartilage injuries are seldom compatible with the active conditions of Army life. A high standard of recovery is required if the soldier is to resume his normal duties after meniscectomy. Operation is only justified when a reasonable guarantee of such recovery can be given. Diagnosis and operative technique demand much attention to detail, and the after-care requires to be intensive and prolonged. Treatment should be complete before the soldier is returned to his unit, and the convalescent depot is an invaluable intermediary between the hospital and ultimate discharge to duty.

My thanks are due to Professor T. P. M'Murray, whose teaching has been closely followed in the methods of diagnosis and treatment herein described, and to Colonel R. A. Broderick, D.S.O., M.C., for permission to refer to cases treated at a General Hospital.

## TRIAGE OF BATTLE CASUALTIES

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AND

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[Received September 2, 1944.]

ON D-Day the only available means of evacuating the sick and wounded from the British Liberation Army was by Landing Ship Tank (L.S.T.). The staff of many of these ships, which had carried the spearhead formations to the beaches of Normandy, included three naval or military medical officers and a number of orderlies whose role was the care of the evacuated patients on the return journey. The ships were equipped and structurally modified to provide facilities for nursing up to 300 patients on stretchers and for such resuscitation and emergency surgical operations as might prove necessary. During the subsequent weeks a large proportion of the casualties continued to be evacuated by this means.

Adequate staffs and vacant beds were available to deal with casualties requiring urgent treatment. It was essential, however, that the main stream of casualties should pass inland by train or road to other large hospitals from which the widest dispersion could be achieved. The threat of overcrowding of the port hospitals is inherent in such a system. Surgical Officers were appointed at each port to guard against this risk and, as clinical connecting links, to determine with the ships' medical officers the distribution of patients within the administrative pattern. The analogy with any strictly military line of evacuation is apparent. In any such line officers may find themselves responsible for determining the distribution of large or small numbers of recent casualties. The word "triage," literally "assessment according to quality," has recently been adopted to describe the process. As the Surgical Officers at one port of disembarkation we have had the opportunity of assessing several thousand recent casualties arriving by L.S.T. within the first forty-five days of the invasion. This somewhat intensive experience forms the immediate background of the present paper.

Successful triage involves the appreciation of three interlinked factors :—

- (1) The number and general character of the patients to be dealt with and to be anticipated.
- (2) The facilities available for dealing with them. These include the capacity of medical units in terms of beds, staff, specialized units, holding and evacuating facilities and the duration and character of the journey to each unit.
- (3) The condition of the individual patient. This involves answers to the questions "Can he safely travel and, if so, how far?" and "Is he in need of treatment and, if so, how urgently?"

The third factor alone may appear to present a sufficient problem, involving as it does the whole of clinical surgery; yet on it must be superimposed the other two. These two factors are different in every situation; they vary from day to day and the unexpected size or character of a single convoy may even alter the optimum disposal of similar cases during its triage. It is necessary to bear in mind that a patient who will not suffer from the journey may obtain earlier treatment by being allowed to proceed to a distant hospital than by taking his place at the end of a long queue of more urgent cases in a busy nearby hospital.

Rapidity is usually called for in triage. In the clearance of a L.S.T. it became an operational necessity in order to expedite reloading. We carried out our triage at the rate of twenty

to thirty seconds per lying patient, a rate which did not delay evacuation by the stretcher bearers. Systematic progress along each line of patients is essential and time is saved if the surgeon can be relieved of responsibility for the search for documents, the adjustment of blankets and the labelling of the patient. Every available moment must be spent in acquiring information bearing on the disposal of the patient and the temptation to launch into detailed investigation merely on account of especial interest must be withstood. Maintaining this purpose in our minds we have been surprised at the amount of relevant evidence which it is possible to gather in this very limited period.

The following brief outline of our practice may provide a useful basis to those who may be called upon to carry out similar rapid triage.

#### THE ASSESSMENT OF THE INDIVIDUAL PATIENT.

On approaching the individual patient we have obtained our first indication of the nature of the problem from that invaluable document, the Field Medical Card. It is not practicable at this stage in evacuation to read extensive notes on the average case. Information is required on four points: (1) the date and time of injury; (2) the provisional diagnosis; (3) any operative procedures; (4) any complications.

When this information can be extracted from the card in five seconds the notes are, from the point of view of the triage officer, good. Even with extensive notes the requisite clarity can be achieved by the free use of bold capitals and the underlining of essentials as, for example, where main arteries have been tied or gas gangrene suspected. A few carefully-written notes are of more value to the patient than a mass of indecipherable detail.

Concurrently with this review of the notes we have consciously utilized three features in assessing the general condition. These are the appearance of the face, the rate and volume of the pulse and the response to such a simple question as, "How are you feeling?" The manner of the response is more likely to provide an indication of fatigue or toxæmia than is its substance, so often the all-embracing "Not so bad." A rapid glance at the tongue is often reassuring or may provide striking evidence of dehydration. The "tongue like a piece of carpet" precludes further travel.

#### LOCAL CONDITION.

As in other campaigns the majority of wounds have affected the soft tissues of the extremities without involving bone or other important structures. Their number alone justifies a somewhat detailed account of their investigation. Similar technique in the search for evidence of the same pathological processes (hæmorrhage, infection, etc.) is in general applicable to such comparable areas as the chest wall and back.

*Limbs.*—Particularly under the conditions which exist in the L.S.T., the removal of dressings would have been dangerous and unduly time-consuming. We are satisfied from hospital reports that the omission of this step has not led to significant errors in triage at this level. The appearance of the dressing is a sufficient index of recent external hæmorrhage. A deliberate search is made for swelling, tenseness, tenderness or discoloration of the tissues surrounding the wound. The onset of pain in a previously comfortable wounded limb often indicates hæmorrhage or infection. The examination is completed by ensuring that the digits are warm and capable of active movement. In the presence of any adverse signs the patient requires full examination and probably active treatment. Material interference with the vascular supply and gas infection demand immediate attention. The majority of the remainder who show adverse signs are, however, fit to travel, and only complete familiarity with the facilities and existing pressure of work on the line of evacuation will enable the triage officer to secure the most expeditious handling of these second priority cases. At this level the existence of a nerve lesion calls only for the suitable protection of the heel or other anæsthetic pressure point. A patient on whom a primary operation has been carried out need be withdrawn from the stream of evacuation only on account of complications.

There remains a large number of patients whose limb wounds show no evidence of compli-

cations but which have received no treatment other than simple dressing. Here the time factor, the period since wounding, becomes important. The surgery required in these cases merges, as the hours pass, from early excision, through later trimming, to prophylactic drainage at periods up to say forty-eight hours. In many, cleansing under good conditions is the sole requirement. These patients must usually be passed into the line of evacuation but, in quiet periods, their treatment in forward hospitals will materially reduce the duration of their disability and conserve manpower. This war, like the last, may well have to be won by *les petits blessés*.

When a limb is encased in plaster of Paris the available evidence is restricted. A useful opinion can, however, usually be formed by considering the general state of the patient, the presence or absence of pain, the circulation and function of the digits, the smell, and the signature of the responsible surgeon.

The recognition of the involvement of a joint by a wound is often difficult during triage. It is necessary to provide for immobilization and possible surgical intervention, especially in the case of the knee joint, before further evacuation is permitted. The only problem added by the existence of a fracture is that of immobilization. Multiple manipulations prior to the patient's arrival at the hospital undertaking definitive treatment have given poor results. The compound fracture of the femur occupies a unique position, in that adequate early immobilization is life-saving and that the modern treatment by skeletal traction virtually precludes inter-hospital transfer. There are thus strong indications for expediting the onward evacuation of a well-immobilized case to a hospital where the patient will be held throughout treatment.

**Head.**—The triage of head wounds is rendered difficult by the fact that penetration of the skull can be excluded only by radiological examination or by an exploration of the wound and is rendered easy by the fact that few patients suffer by a delay of several hours. A head wound can be accepted as trivial only when penetration of the skull has been fully excluded. Only in the exceptional head injury will unconsciousness or evidence of compression preclude travel to the nearest available neuro-surgeon for operative treatment.

**Spine.**—The patient suffering from a fracture of the spine can usually travel in the stream of casualties if urination is adequately provided for, by suprapubic drainage if necessary, and if suitable precautions are taken to avoid the occurrence of bed sores.

**Face and Jaws.**—The general and local condition of most patients with major wounds of the face and jaws has allowed of their being passed through to the nearest Maxillo-Facial Unit. The threat of suffocation by the backward-falling tongue associated with a badly smashed jaw may constitute an extreme emergency. Where there is no conveniently sited Maxillo-Facial Unit, early stabilization of the bony framework by nearby general and dental surgeons may be necessary.

**Eyes.**—The preservation of sight in an eye is so important and the conservative surgery of the eye so specialized that the location of the nearest ophthalmic surgeon must be known to the triage officer. Injury to both eyes or the suspicion of a penetrating wound of either globe has earned high priority in disposal. Our only exception has been where secure evidence existed that only one eye was damaged and that irretrievably. Under these circumstances operative treatment is not urgent within the first ten days.

**Chest.**—It is now accepted that most patients with penetrating wounds of the chest travel well. Apart from the sucking wound, rare at this level, the urgent cases are those with active intrathoracic hæmorrhage, a large effusion or a tension pneumothorax. The available evidence of these complications will be dyspnoea, a poor and rapid pulse and pallor or cyanosis. To those not called upon to carry out their triage in the noisy tank deck of a L.S.T. the familiar local clinical signs will be available if confirmation is required. A brief question regarding pain and a hand on the abdomen are wise precautions to exclude the dangerous and urgent thoraco-abdominal wound in which an incomplete diagnosis is so apt to be made.

**Abdomen.**—So much has been written about penetrating wounds of the abdomen that little need be said regarding their disposal. They represent a small but dramatic proportion

of wounds requiring competent surgery as early and as far forward as is compatible with the patient being held for ten days after operation. Thereafter they travel well.

*Back.*—The majority of wounds of the back which demand urgent treatment do so by virtue of penetration of the pleura, peritoneum or spinal theca. The remainder are dealt with on the lines for the soft tissue wounds of the limbs.

*Buttock.*—Two major hazards exist in wounds of the buttock: the penetration of peritoneum, rectum or bladder and the development of gas infection. When any immediate surgery is available for uncomplicated flesh wounds some priority is well given to those of the buttock.

*Burns.*—Almost all burns have been confined to the face and hands. In contrast to the experience of the Middle East they have constituted a small problem in terms both of numbers and of severity. Clinical examination in triage is largely confined to the inspection of the tongue and the feeling of the pulse, the latter often most accessible in the brachial artery. Extensive burns travel notoriously badly.

*Gas Infection.*—In triage, gas infection has occupied a position of peculiar importance. These cases are very liable to be overlooked in their early stages by a medical officer responsible for a large number of patients. Among these he naturally tends to devote his attention to those suffering from wounds carrying an obvious threat to life. Gas infection may meantime be developing insidiously in a limb-wound, initially and, at that time rightly, accepted as uncomplicated. The threat of gas infection has coloured our approach to every wound. The final review of all patients prior to their dispersal has disclosed not a few cases of actual and potential gas infection. Our first indication of this has usually been that the patient has appeared more exhausted or toxic than seemed warranted by the nature of the wound. An unduly rapid pulse, otherwise unexplained, or a complaint of pain of recent onset arouses suspicion. Local manifestations have been a serum-soaked dressing, superficial oedema with pallor or with reddish or brownish discoloration of the skin, and general or local swelling of the part with intense tenderness of similar distribution. Crepitus and the over-stressed characteristic odour have sometimes been present. Established gas infection places the patient in first priority. It is desirable to provide early investigation and prophylactic decompressive surgery for the penetrating wound associated with a tense hæmatoma of the calf, thigh, buttock or shoulder, those happy hunting grounds of the anaerobe.

*Walking Wounded.*—As might be expected very few among the 37 per cent of casualties who formed the "walking wounded" were unfit for onward transit. Their review was, however, justified by the exceptions which have included patients suffering from wounds of eye, mandible and skull, and the occasional soldier who, despite the most severe injury to an upper limb, is too proud to lie down. The all-important function of a right hand may be saved by early treatment when such is possible.

*Medical Conditions.*—Among the "medical patients," all have been fit to travel onward with the exception of the occasional case of pneumonia or of high fever and a very few exceptionally severe psychiatric casualties.

Surprisingly, in view of the vicious motion of the L.S.T., sea-sickness did not constitute a common or difficult problem in differential diagnosis in our experience. Two other complaints, backache and abdominal discomfort, were extremely frequent among all types of lying patients. The former was clearly due to the prolonged recumbency on a stretcher; the latter was generally attributed by the sufferers to constipation.

Of the casualties seen by us 6·3 per cent were sent for immediate treatment; 84·7 per cent travelled on directly by hospital train; 9 per cent went to the intermediate road-transit hospital which could be reached within an hour from the port. This last figure was higher than might have been expected owing to the presence there of specialized surgical teams for neuro-surgery and maxillo-facial injury.

The following conditions include the majority of those earning first priority: Active hæmorrhage; gas infections; interference with the circulation in a limb; penetrating wounds of the eye; penetrating wounds of joints not immobilized; compound fracture of

femur inadequately immobilized ; paraplegia requiring suprapubic cystostomy ; complicated penetrating wounds of chest ; penetrating wounds of abdomen unless convalescent ; extensive burns ; severe toxæmia or collapse from whatever cause.

Triage can never, however, consist of making a clinical diagnosis, applying to a list, and reading off the patient's disposal. Its purpose is the dispersal of patients in such a way that evacuation is expedited and yet that the fullest possible use is made of forward surgical facilities for patients who will benefit thereby, either by the saving of life or the reduction of the extent or duration of disability.

#### SUMMARY.

A brief account is given of the administrative and clinical inter-relationship existing at a port of disembarkation of casualties arriving from Normandy by L.S.T.

The particular clinical features found to be of value in the rapid assessment of battle casualties for purposes of disposal are described.

#### ACKNOWLEDGMENT.

We are indebted to Colonel E. W. Ashworth, *T.D.*, A.D.M.S., Evacuation, for permission to forward this paper.



## *Clinical and Other Notes.*

### NEUROMATA OF PALMAR FASCIA SIMULATING DUPUYTREN'S CONTRACTURE.

By Major D. LL. GRIFFITHS,  
*Royal Army Medical Corps,*  
*Orthopædic Specialist,*

AND

Major T. CRAWFORD,  
*Royal Army Medical Corps,*  
*Specialist in Pathology.*

[Received February 23, 1944.]

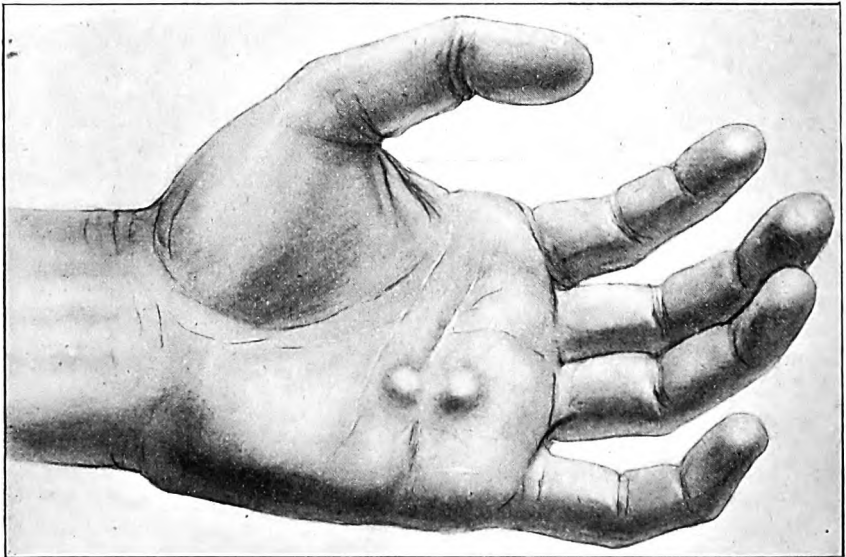
DUPUYTREN'S Contracture is not very common in military surgical practice. It is essentially a disorder of older life. Its occurrence in a young man, and in one hand only, should always lead to speculation as to the accuracy of the diagnosis and, therefore, as to the most appropriate method of treatment.

#### CASE REPORT.

Private A. C., aged 31, serving in the Worcestershire Regiment, was admitted to a Military Hospital in England on January 8, 1943. He had two-and-a-half years' service.

He gave a very long history of two tender lumps in the palm of his left hand, near the base of the ring finger. These had given him no real disability in civil life as a general labourer but, being tender to pressure, they caused pain during rifle drill. He had not noticed any tendency for the ring finger to contract into flexion, neither had he noticed any increase in the size of the nodules. There was no family history of any similar disorder.

He was a healthy man of good average physique.



Condition of left hand on clinical examination.

*The left hand (see fig.)* showed two well-marked nodules above and below the distal palmar crease in the line of the ring finger. The nodules were hard, adherent to skin, quite definitely tender to pressure and, apparently, arising from the palmar fascia. There was no actual

contracture of the ring finger but full passive extension of that digit was not easily obtained and stretching the finger backwards produced pain in the nodules.

The right hand was absolutely normal.

The lesion in the left hand was regarded as an early case of Dupuytren's Contracture. The tenderness, which was really quite striking, was regarded as exaggerated and the opinion was expressed that the patient was making the most of his complaint. The wrongness of this view was demonstrated later in the laboratory.

*Operation.*—After two days' skin preparation the nodules were carefully excised through a transverse palmar incision. They were found to arise from the palmar fascia and they were dissected from the skin with some difficulty. The fascia around the nodules was considered to be a little thickened. No nerve fibres were seen in contact with or in connexion with the nodules.

The operation wound healed cleanly and the patient was discharged to a Convalescent Depot on January 27.

#### HISTOLOGY.

The specimens, which were two small, roughly spherical pieces of tissue 6 and 8 millimetres in diameter, each consisted of a circumscribed tumour separated from the skin layers by a well-defined fibrous capsule. This capsule was rich in small arterioles and in fine nerve fibres.

The tumours themselves were composed of interlacing hyaline collagen fibres producing a typical fenestrated arrangement. In the meshes of this network lay the tumour cells. These had large vesicular nuclei with well-defined nuclear membranes and single, small, dense nucleoli. The cytoplasm of the cells was scanty. The only muscle fibres included in the tumours were those in the walls of the small arterioles which passed in from the capsule.

The general histological features were those of benign neurofibromata.

#### COMMENT.

The association of neurofibromata with Dupuytren's Contracture and with conditions simulating that contracture has long been recognized (Ewing, 1940). It does not, however, appear to be widely known. The usual view taken is that Dupuytren's Contracture is an "active benign hyperplasia of the palmar fascia" (Horwitz, 1942), and interest in the cellular elements found in the sclerosed tissue of the palm has mainly centred about their possible inflammatory origin. These cellular elements are, however, very variable and Ewing (1940) considers that they and their arrangement so frequently resemble those of hyaline neurofibromata that he actually discusses Dupuytren's Contracture as part of the section on neurofibromata in his book on tumours. It is seldom, however, that two *encapsulated* neuromata, such as are here reported, are found in the fascia of the palm.

The truth is that Dupuytren's Contracture is probably a very variable and diverse condition. Certain French authors (Laignal-Lavastine and Nogues, 1918, and Noica and Parvulesco, 1932) have been struck by its development following various nervous disorders though, unhappily, they do not appear to have studied the histology of any of the cases they report.

The practical bearing of the case reported here is obvious. Nodules in the palmar fascia of young soldiers are not common. If present they may be of a neurofibromatous type. If so they will be tender and they may cause pain during arms drill. Their rational treatment then will be excision and a study of their histology should prove interesting.

#### ACKNOWLEDGMENT.

We wish to thank the Officer Commanding the Military Hospital concerned for his kind permission to forward this case.

#### REFERENCES.

- EWING, J. (1940). "Neoplastic Diseases," Philadelphia.  
HORWITZ, T. (1942). *Arch. Surg.*, **44**, 687.  
LAIGNAL-LAVASTINE, M., and NOGUES, G. (1918). *Rev. Neurol.*, **25**, 475.  
NOICA, D., and PARVULESCO (1932). *Ibid.*, **1**, 703.



## FORMATION OF A CONTROL POST FOR THE TRIAGE OF CASUALTIES BETWEEN AN ARMY AND BASE HOSPITALS.

By Brigadier J. GWYNNE MORGAN, O.B.E., T.D.

[Received November 29, 1944.]

THE problems concerned with the rapid evacuation of battle casualties are enormous and much has been written about them. Each battle has its own individual problem which can only be solved by the man on the spot, but where a planned attack is being made on a semi-static line, some method of triage, which gets the patient as quickly as possible to the surgeon, limits the numbers admitted to each hospital during a given period, and thus lessening the work of the hospital staff, is necessary. The attack on Cassino, Gustave and Hitler lines, and subsequent advance to Rome was a preconceived offensive and sufficient time was available to formulate a plan of this nature. The Control Post established was an unqualified success and it is thought that a description of the methods may be of use on future occasions when similar circumstances arise.

At the outset of the above offensive the enemy were in the neighbourhood of Cassino and were holding a strong defensive position called the Gustave line. Evacuation was almost entirely by road, as there were no air facilities, and the use of the rail was minimal. A site was chosen, well in the rear of the Army, where Army ambulances could hand over their cases to District ambulances. This site was established at Capua which was on the Army axis and also at a point where the roads branch to Naples and Caserta. No medical unit was available to form this post. A scratch team was collected together consisting of medical officers from a District staff, the personnel of two hospital expansions, a surgeon from an F.S.U., and 120 low category O.R.s loaned by R.T.D. as stretcher bearers.

A central building existed, on the site chosen, which had previously been a block of flats. The ground floors were adapted to form Resuscitation Wards and a theatre was also established. The upper floors housed administrative offices and personnel. This formed the focal point and, with the help of an enthusiastic company of R.E.s, the post was laid out. The entrance (one way) opened on to an area of hard standing, capable of holding 50 to 60 ambulance cars. (In actual fact this was never used as ambulances came from forward units in twos and threes, and these were dealt with before others arrived, but it should be provided in case of a rush.) From this a road led to the reception tent for the lying cases and to a walking wounded tent. Ambulances were unloaded singly and the empty Army ambulance car proceeded on a one-way road to the stretcher and blanket dump and re-fuelling station. Here the driver was able to re-fit his ambulance and obtain refreshments for himself from an excellent canteen.

A series of E.P.I.P. tents labelled with the number of the hospital concerned lay behind the lying reception tent, between it and a one-way road on which ran the M.A.C. belonging to the District. One ambulance was stationed outside each tent, and as it moved off with a load its place was immediately taken by another from a waiting taxi rank of 20 to 30 ambulances behind.

The patients, after having particulars taken from A.F.W. 3118, were examined and divided into 3 classes; (1) In need of resuscitation or operation; (2) urgent removal to a specialist hospital; (3) less urgent and non-specialist cases.

Class 1 were immediately transferred to the Resuscitation Wards.

Class 2 were immediately placed in ambulances and despatched to their appropriate hospital.

Class 3 were taken to the appropriate E.P.I.P. tent, where they waited until a full ambulance load for their particular hospital was ready. (No case waited more than thirty minutes.) Here they were attended by ladies of the B.R.C.S. and given food, drinks, cigarettes and other comforts.

The walking wounded were directed into a large hospital extending tent and here made as comfortable as possible whilst awaiting transport in T.C.V.s to the hospitals. Seats, wireless, newspapers, magazines, tea and cakes were provided by the B.R.C.S.

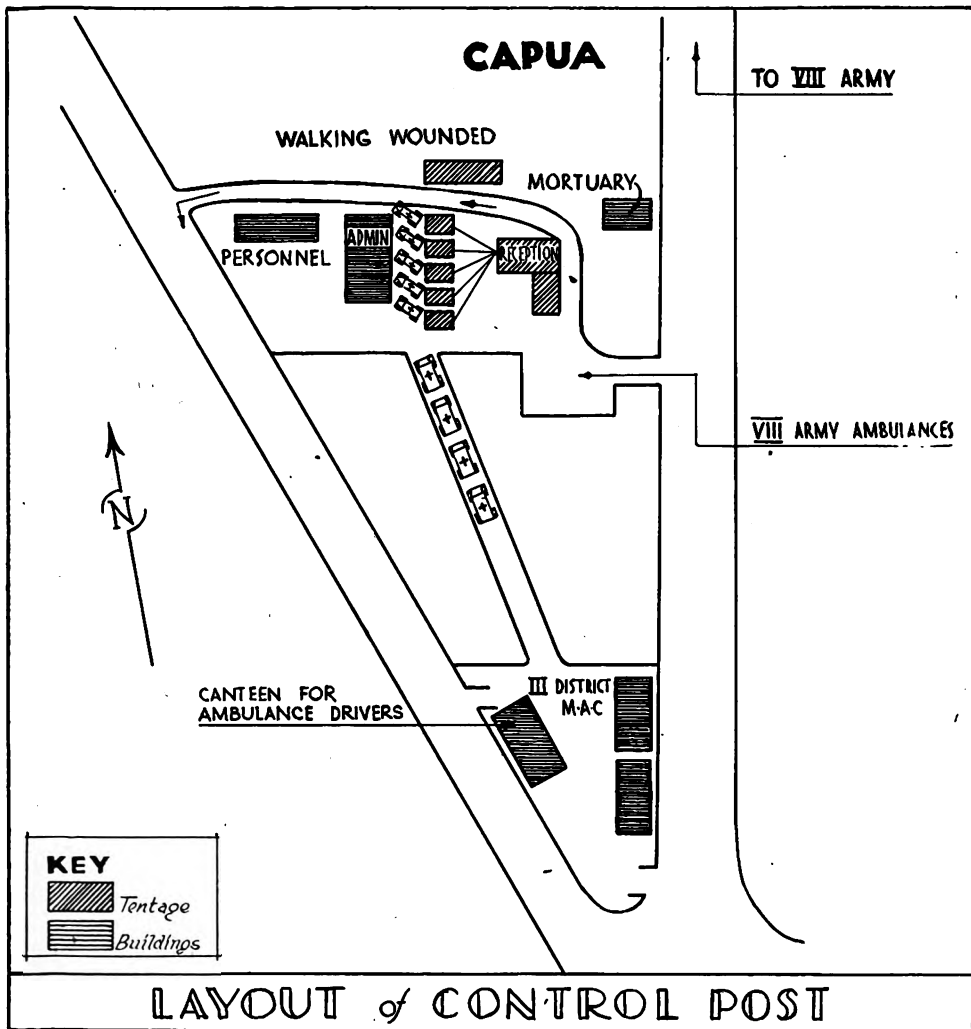
The administrative block was in direct touch with areas and hospitals. Bed states were

rendered twice daily ; the medical officer on duty in the reception tent had a large board on which was clearly shown the destination of all types of nationalities and patients for each period of twelve hours. (It must be appreciated that eight or nine different nationalities were dealt with, each requiring special hospitalization.) By this means cases were distributed to base hospitals on an equable basis. The receiving hospital for general cases usually had a period of twelve hours on and at least twenty-four hours off. Surgical teams and their staff were not overworked for *long* periods at a time, thus the quality of their work remained on a very high level. The intervals of rest enabled routine preparations, such as sterilization and cleaning of theatres, etc., to be carried out without a rush.

Special cases such as maxillo-facial, neuro-surgical, etc., reached their appropriate surgeon in record time (one case was operated on in a special hospital at the base eight hours after being wounded), and the saving of life must have been considerable.

The layout described is essentially simple—buildings are an advantage but not absolutely necessary, the one essential being one-way traffic for both Army and District ambulance cars, and adequate Regimental Police supervising the traffic.

Ideally, the Control Post should be (a) not more than 50 miles behind the fighting line ; (b) road communication both to Army and Base Hospitals should be good ; and (c) the nearest group of Base Hospitals should be within 30 miles of the Post.



## THE JERRICAN FLOATING STRETCHER.

[Received January 10, 1945.]

Lieutenant-Colonel J. D. FINLAYSON and Lieutenant P. R. DUNCAN, Royal Army Medical Corps, have devised a simple method of transporting a lying casualty across water.

We regret that the limitations of space prevent our publishing their article in full. From the one illustration printed it will be seen that this is a sensibly simple and practical suggestion.

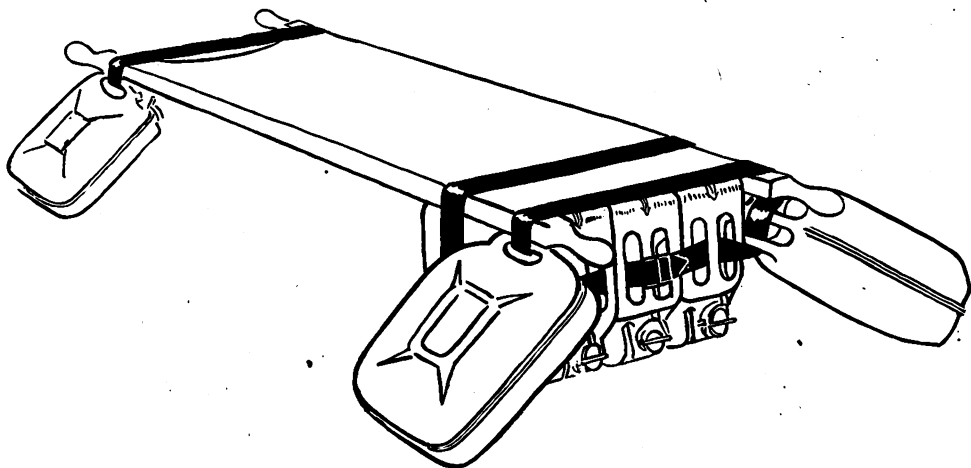


FIG. 1. General view.

The writers describe the method of use as follows :—

With a lying casualty on board, the bearers carry the floating stretcher into the water by the handles in the usual manner. A shallow bank is an advantage. A bearer who is wading or swimming can pull the raft across a water obstacle. At a recent demonstration to Medical Officers a rope was taken over by a swimmer, the floating stretcher attached, several casualties being then successfully transported in rapid succession. Guided by a strong swimmer, the raft may be floated downstream if the current be moderate. It is possible to construct this raft from the stretcher upon which the casualty has been brought to the water's edge without removing him. The obstacle having been crossed, the floats may be removed, again without disturbing the wounded man. Pain is kept to a minimum and the additional shock produced by lifting on and off a raft is avoided. When making a floating stretcher while a casualty is *in situ* the foot end should be constructed first in order that the casualty may remain in the head-down position as far as possible.

## HÆMOTHORAX ASPIRATION BY BLOOD-TAKING APPARATUS.

By Lieutenant H. MULLER,  
Royal Army Medical Corps.

[Received August 2, 1944.]

IN the treatment of thoracic injuries complicated by hæmothorax, emphasis is rightly placed on early and complete aspiration of the pleural cavity ; the operation may have to be repeated as blood and effusion may accumulate for a day or two after the first aspiration.

Under field conditions, and even in General Hospitals, the apparatus for the easy and rapid emptying of a large hæmothorax may not be at hand. Using the largest syringe available (usually one of only 20 c.c. capacity) even when a " two-way " tap is used, the procedure is slow and tedious and often painful and exhausting to an ill patient.

A simple and effective alternative apparatus has been found in the Army pattern " Blood Taking Apparatus " and bottle issued for collecting blood from donors.

The operation closely resembles that for taking blood from a vein. The skin over the selected intercostal space and a track down to the pleura are anæsthetized, the taking set and bottle assembled and the blood-taking needle inserted through the anæsthetized area into the pleural cavity. Suction is applied by means of a reversed Higginson syringe and the pleural contents flow freely into the blood bottle. The rate of flow is such that the operation is reasonably expeditious yet it is not so fast as to cause a dangerously rapid re-expansion of the underlying lung. The length of the needle is just right for most chests but it is possible that a longer needle may be required for an unusually thick chest wall.

This method of aspirating hæmothorax has been found eminently satisfactory in use in a Field Hospital.

My thanks are due to Colonel G. F. Allison, *C.B.E., M.C.*, Commanding Officer of — General Hospital, for permission to forward this paper.

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### AN IMPROVISED " BLANKET STRETCHER "

By Captain C. L. KASHYAP,  
*Indian Medical Service.*

[Received November 6, 1944.]

SEVERAL senior officers to whom the improvised stretcher described in this article was shown had not seen it before. It was therefore felt that this simple improvisation was not generally known and the writer was encouraged to prepare a description of it for publication.

It was devised for use as a " Hill Stretcher " during the Tunisian campaign and has been used again with success in Italy.

#### MATERIAL REQUIRED.

- (i) One Army blanket.
- (ii) Two strong poles, each about  $7\frac{1}{2}$  feet in length ; bamboo poles are ideal. The jointed uprights of a 180 pounds tent may be used and make carriage easier as, instead of two long poles, only four short ones have to be carried.

#### METHOD.

- (1) Spread the blanket on the ground. Lay one pole parallel to, and 45 inches away from, a long edge of the blanket. Place the second pole 18 inches from the first and parallel to it. The two poles divide the blanket into three portions : (a) 24 inches in breadth ; (b) 18 inches in breadth ; (c) varies from 10 to 12 inches according to the width of the blanket.
- (2) Fold flap (a) over the poles and tuck the extra 6 inches of blanket under the second pole.
- (3) Bring flap (c) over.
- (4) Fold the blanket at either end of the stretcher back twice, including 4 inches of blanket in each fold. If the blanket is too long, more can be folded back to bring it to the correct length. The stretcher is now ready for use.

#### ADVANTAGES.

- (i) Can be made quickly and easily. Every man in a battalion can be taught to make it.
- (ii) The material required is readily available. Bamboo poles are the best, but tent poles, branches of trees, etc., serve as well.

(iii) Very light and easy to carry. A testimony to this fact has been its universal adoption by company stretcher bearers of two battalions in the Division. Total weight between 10 and 12 pounds (a new blanket weighs 6 to 7 pounds and an old one 4 to 5 pounds). Bamboo poles  $7\frac{1}{2}$  feet long weigh (unless freshly cut, when the weight is greater)  $2\frac{1}{2}$  pounds each. Weight of a standard G.S. stretcher is 26 pounds.

(iv) Can be carried in three parts by three men, making a very light load for each man, and is therefore specially suited for "Night Patrols" in difficult country.

(v) The patient lies securely in the stretcher, as his weight tends to bring the poles together. The rough surface of the blanket makes him less likely to slip when the stretcher is inclined than the smooth surface of a G.S. stretcher.

(vi) The patient can be transferred to a G.S. stretcher with the minimum of disturbance by placing the "Blanket Stretcher" over the G.S. stretcher and withdrawing the poles. The patient now lies on a G.S. stretcher with two layers of blankets underneath him. When another blanket has been placed over him, he is ready for loading into the ambulance car.

I should like to thank my Commanding Officer, Lieutenant-Colonel R. J. Niven, M.C., R.A.M.C., for permission to forward this article for publication.

I am also indebted to Colonel D. Datt, I.M.S., for his encouragement.

#### ARTERIAL HÆMATOMA—SPONTANEOUS CURE.

By Major R. E. WATERSTON,  
*Royal Army Medical Corps.*

[Received October 3, 1944.]

CIRCUMSCRIBED arterial hæmatoma is a form of arterial aneurysm in which the wall of the sac is formed of blood clot and condensed fibrous tissue from the surrounding structures. In view of the large number of cases which are likely to result from penetrating wounds, a spontaneous cure which occurred in a case seen recently is reported here.

Private B., aged 26, was wounded on the lateral aspect of the left thigh by a small shell splinter on July 10, 1944.

When seen a week later the small entrance wound had practically healed, and X-ray showed the presence of a small metallic foreign body deep in the quadriceps, anterior to the upper third of the femur. There was some limitation of flexion of the knee, but no swelling in the region of the wound was noted.

On July 24, while walking about, he reported the sudden onset of intense pain in the left thigh. He stated that the thigh felt tense and stiff, and that the pain was like cramp. After treatment by rest and morphia the pain subsided.

The day following, a localized swelling could be made out on the antero-lateral aspect of the upper part of the left thigh. This swelling was firm, tender and fixed, and lay in the substance of the quadriceps. It could be covered by the palm of the hand. No pulsation could be felt or seen, but there was a loud systolic bruit on auscultation over it. This bruit disappeared when the common femoral artery was compressed. There was normal pulsation present in the dorsalis pedis and posterior malleolar arteries, and no sign of impairment of the circulation of the limb distally was present. There was subcutaneous ecchymosis on the medial side of the thigh over the lower end of Hunter's canal, and also on the lateral side of the leg below the knee and in the popliteal fossa.

It seemed clear at this time that there had been a diffuse hæmorrhage into the tissues which had become localized to form an arterial hæmatoma. The position of the swelling indicated that the lateral femoral circumflex artery or one of its muscular branches was the vessel indicated. The position in the substance of the quadriceps and the presence of clot would account for the absence of pulsation.

On the advice of Brigadier Fettes, Consultant Surgeon, Western Command, conservative treatment was adopted. The patient was kept strictly in bed and the swelling in the thigh

was observed carefully. It began to decrease in size, becoming firmer and more easily palpable as it did so. The systolic bruit, too, became gradually fainter. Movement of the leg was started in a week's time and, finally, after a month he started to walk. There was no recurrence of the hæmorrhage. After six weeks the swelling was just palpable as a small firm area in the quadriceps and no bruit could be heard. The movements of the knee were full and all that he could notice was a slight stiffness at the site of the wound.

Spontaneous cure of an aneurysm is rare, the more usual course being gradual enlargement along the path of least resistance to pressure. In this case the clinical findings indicate that clotting in the sac occurred early and following this there was gradual absorption of the clot. It is general for such thrombosis in the sac to extend into the artery. The artery in this case being the lateral femoral circumflex, it is not possible to be certain whether arterial thrombosis has occurred or not. In view of the completeness of the cure it seems likely that it has.

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### Current Literature.

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ROLL, J. M. **Outbreak of Diphtheria at an R.A.F. Camp.** *Monthly Bull. Ministry of Health & Emergency Pub. Health Lab. Service (directed by Med. Res. Council).* 1944, May, v. 3, 79-84.

An outbreak of diphtheria occurred in an R.A.F. camp in April, 1943. The population at risk was about 1,700. Apart from two individuals who showed no clinical signs of diphtheria and from whom *C. diphtheriæ mitis* was isolated, the infecting organism in all cases was *C. diphtheriæ intermedius*. Twenty-six cases and five temporary carriers were recognized. The boundary line between a case and a carrier was sometimes difficult to define. Most cases were mild, and the outbreak caused anxiety chiefly because of its possible effect on operations. There was, however, one death, in a W.A.A.F. cook who had gone on leave just before the first cases were diagnosed.

The first cases (apart from the fatal one, about which news was received later) occurred on April 7. By April 14 the number known was 22. Between April 13 and 16; all persons on the camp were Schick tested, and it was decided to inject all positive reactors with two doses of A.P.T. A proposal to use combined active and passive immunization was rejected. Between April 16 and May 10 nine more cases occurred, and after that no more.

Healthy carriers seem to have played little part in the spread of the outbreak. The evidence suggests that case-to-case infection may have occurred throughout. It is possible that the W.A.A.F. cook who died was the cause of the outbreak, and there was a suggestion that the further spread of infection was determined by occupation and sleeping-hut location, though the evidence was far from conclusive. The importance of bacteriological typing was shown by the rapid elimination from suspicion of two *mitis* carriers. R. KNOX.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

McGUINNESS, A. C., & GALL, E. A. **Mumps at Army Camps in 1943.** *War Medicine.* Chicago. 1944, Feb., v. 5, No. 2, 95-104, 14 charts.

The incidence of mumps in U.S. Army troops has been low during the present war and will probably remain so. Nevertheless almost every Army post has had cases and in several instances epidemics have occurred.

In general, the spread of mumps through a military establishment is slow compared with that of other upper respiratory tract infections, but in like manner the subsidence of an outbreak is slow, and once established in the late autumn the disease will usually persist well into the spring and early summer. This conclusion emerged from the study of an epidemic of 1,378 cases at Camp McCoy, Wis., during the winter and spring of 1943 and from observations at other camps. The disease appeared in numerically significant outbreaks only

among soldiers from rural areas in the south and south-west, but even among the more susceptible groups it was uncommon for as many as 10 per cent of the men in any one company to contract mumps in any single season. Approximately one-third of the patients were hardly ill, one-third had moderately severe uncomplicated mumps, and one-third were seriously ill with mumps complicated by orchitis or meningo-encephalitis or both. The last-mentioned complications occurred in some instances without parotid involvement, the diagnosis being confirmed in a number of cases of orchitis, by complement fixation tests in which antigen of a dilute suspension of parotid glands from infected monkeys was employed. The incidence of orchitis was slightly over 36 per cent and in 83.5 per cent of cases it occurred between the first and eighth day of disease. Orchidectomies were performed for orchitis on 83 soldiers with considerable relief from pain and little gross atrophy was found when the patients were re-examined two months later. The authors consider it justifiable to suggest orchidectomy on the second testicle as soon as involvement is recognized and in cases of severe unilateral orchitis.

Involvement of the central nervous system was suspected or known to be present in 55 patients, although lumbar puncture was carried out in only 19. No correlation between severity and pleocytosis was observed. In one patient the involvement took the form of an ascending transverse myelitis, with recovery, while in two there was an abrupt onset of meningo-encephalitis accompanied by a grossly bloody spinal fluid suggestive of a sub-arachnoid hæmorrhage. A fatal case in another camp showed post-mortem findings compatible with encephalitis. In all but a few cases the symptoms were of relatively short duration and recovery was prompt and complete. The complication appeared during the first week of the disease in 80 per cent of cases. There was some indication that the youngest and oldest soldiers were somewhat more susceptible to orchitis, but no correlation could be found between age and the incidence of meningo-encephalitis. Total and differential leucocyte counts of uncomplicated mumps showed a low total white cell count with a relative lymphocytosis. For patients with orchitis and meningo-encephalitis the ratios were for the most part within low normal limits, but the total counts were generally higher than those found in uncomplicated mumps.

A. JOE.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

HOWAT, H. T., & ARNOTT, W. M. **Outbreak of Pneumonia in Smallpox Contacts.** *Lancet.* 1944, Sept. 2, 312.

The occurrence, in relatively immune contacts of virulent smallpox, of a febrile illness accompanied by general toxæmic symptoms but devoid of localizing signs, has been recorded in a number of instances. The special interest attaching to the present series was the discovery, by X-ray examination, of evidence of pulmonary lesions in six of the seven cases observed.

In a Middle East base hospital a patient was admitted on the fourth day of illness: on the 12th day he died of confluent smallpox. No specific lung lesions were found post-mortem. Subsequently seven close attendants, all "protected" individuals, became ill. Symptoms developed in six cases between the 11th and 14th days after first exposure to infection, and in the remaining case on the 18th day. Headache, general pains, chills and sweating ushered in a febrile reaction which lasted four to twelve days. No rash was seen. Catarrhal symptoms were absent; cough was not a marked feature; there were no deaths, and sequelæ did not occur, though convalescence tended to be protracted. X-ray changes were evident in the lung fields in six of the seven cases from the third day onwards, and in two they persisted into the sixth week; these consisted of fine diffuse mottling, usually in the lower lobe; in some cases better defined aggregations showed as rounded shadows in the middle and lower zones of both lungs. The authors consider that the picture most closely resembled that of atypical or virus pneumonia—possibly due to the smallpox virus or to some other virus of unknown origin.

J. PICKFORD MARSDEN.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

BTESH, S. **Infective Hepatitis in Palestine.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1944, Aug., v. 38, No. 1, 35-47, 4 charts and 3 graphs.

In Palestine "catarrhal jaundice" is common in the children and rare in the adults of the local Arab and Jewish population. Since 1918 it has appeared in minor epidemics among immigrants. In 1938 many British and Jewish members of the Police Force were affected but only a few Arab policemen and none of the adult Arab inmates of the Prison Labour Camp. Epidemics among Jewish immigrants in 1940 and British troops in Palestine have been reported. [Kligler *et al.*, below; Cameron, J. D. S., *Bulletin of Hygiene*, 1944, v. 19, 11]. Infective hepatitis is prevalent in the more densely populated parts of the Mediterranean littoral. In towns the cases are sporadic. There are certain rural "jaundice areas" where epidemics followed the arrival of new settlers.

Epidemics occur where people are crowded together and are most frequent in autumn and early winter. The average incubation period is twenty-eight days. One instance of presumed case-to-case infection is cited to show that a case may be infective early in the incubation period, and another to show that infectivity may persist after apparent clinical cure, but the author quotes Cameron's more orthodox view that the period of infectivity covers part of the incubation period, the preicteric phase and part at least of the icteric phase.

The clinical course of the disease was studied in 750 cases. The typical case presented (1) an initial fever which was probably part of the disease and not due to another infection which precipitated infective hepatitis, (2) an intermediate afebrile stage with anorexia and lassitude, (3) a hepato-toxic stage with slight fever for one to three days, epigastric pain and sometimes vomiting and diarrhoea, (4) a period of jaundice with improvement in the general condition and no fever. In some cases abdominal colic, nausea and vomiting were persistent. Improvement was usually slow and steady, and jaundice faded in two or three weeks. Rarely jaundice persisted for months with occasional rises of temperature. In milder cases there was jaundice without symptoms. In one-third of the cases there was no obvious jaundice. No true relapses were observed, but 10 patients who did not recover completely were admitted for exacerbations between four and eight months after discharge. These exacerbations usually occurred at a time when infective hepatitis was on the increase.

Eight of the severe cases admitted to hospital (6.8 per cent) died within a fortnight of the onset of illness. In six the clinical and post-mortem findings were those of acute yellow atrophy. In two with slight jaundice and palpable liver there were terminal hyperpyrexia and delirium and post-mortem examination showed 'congestion' of the liver and kidneys and hemorrhages in the gastric mucosa and omentum. These cases are said to be examples of a "hepatorenal syndrome."

Blood counts in about 150 patients who recovered showed a leucopenia with a slight monocytosis. In fatal cases there was a leucocytosis in the hepato-toxic stage. This finding may be of help in prognosis.

In treatment intravenous glucose and insulin were used extensively without benefit. Quinine (0.25-0.5 gram intramuscularly for two or three days) appeared to benefit in a few cases.

A. M. MCFARLAN.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

JACOBY, A., & OLLSWANG, A. H. **One Dose, One Day Treatment of Gonorrhoea with Sulfathiazole.** *Amer. J. Syph.* 1944, July, v. 28, No. 4, 413-16.

The authors of this article report on the treatment of 62 out-patients [apparently male] each with a single dose of 8 grams sulphathiazole. Thereafter they were examined daily for a week, apparently by smears and cultures. In 47 patients the after-examination included two tests (smear and culture) of the prostatic secretion, and in 7 one such test was made. Altogether the period of observation averaged 12.7 days.

Of the 62 patients so treated, 50 are said to have been cured. Besides them, one patient



who had a single dose of 6 grams, 5 who had 8 grams in 2 to 4 doses, and one who had 4 grams 4 times in the day are also said to have been cured.

Epitomes of 5 illustrative cases are given. The authors think that the results show that the one-dose method merits a more extended trial.

L. W. HARRISON.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

M McNALLY, W. D. **Three Deaths from T.N.T. (Trinitrotoluene) Poisoning.** *Indust. Med.* Chicago. 1944, June, v. 13, No. 6, 491-4. [17 refs.]

The introductory parts of this article are based upon observations and research made during the last war, mostly in England, into the toxicology of T.N.T. (or trinitrotoluene), the most widely used of all high explosives. They present a useful summary of the action of this poison; but only a small number of many thousands exposed to risk by manipulating the material have shown signs of toxæmia. Young workers entering dust-laden rooms may complain of dizziness, fatigue and drowsiness. Serious damage to the kidneys may result; jaundice is an alarming indication; it seldom appears before the fourth week of exposure and may develop without previous warning. In fatal cases, delirium, convulsions and coma may come on within three weeks of the appearance of jaundice. In fatal cases atrophy of the liver is the striking feature, the organ being half its normal size; its surface is reddish with elevated gamboge-coloured areas, pin-point to walnut in size. Three cases which ended fatally are described in some detail. The first worked for four weeks with T.N.T. on a loading line; then he fell ill and died two weeks later. The second case worked with exposure to T.N.T. off and on for nine months; then he became ill and was in hospital only eight days before death. The third was exposed for some fifteen months, off and on, then he collapsed and died after three weeks in hospital. The clinical state and the post-mortem findings are in accordance with those already described by others, except that in the second case the liver was somewhat enlarged and in the third it was definitely large and palpable three fingers' breadth below the costal margin. No trinitrotoluene was found in any of the tissues.

E. L. COLLIS.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

MANN, J. **Analysis of 1,009 Consecutive Accident Cases at One Ordnance Depot.** *Indust. Med.* Chicago. 1944, May, v. 13, No. 5, 368-74, 6 graphs.

The operations carried on at the depot where this study was made consisted in removing military stores from railroad car to warehouse and later reversing the process for loading outgoing ships. Some 2,000 workers were employed of whom 700 were women. Good first-aid facilities were always available day and night, and records were kept of each accident case. The most frequent accidents were injuries to the hands; next came those to the feet. The study, unfortunately, only covers a period of less than four months; it is well done and would have gained much by being extended over not less than twelve months. The highest rate of accidents was in the youngest group employed, with a progressive decline as age increased. Working hours were 10 per day—7 a.m. to 12 noon, with a break of 1 hour, then 2 p.m. to 6 p.m. The highest incidence of accidents was between 11 a.m. and noon; the incidence started low in the afternoon, but rose more rapidly than the morning and reached a peak in the last hour of the day. The morning reaction is ascribed mainly to starting work without any adequate breakfast; otherwise the incidence is held to reflect the oncome of fatigue. Even though there were few types of work at the depot upon which women were not employed, women were found to suffer many fewer accidents than men; they were less accident-prone; indeed, women may be assigned hazardous tasks with more equanimity than men. The expression "that's too dangerous for a woman" is no longer tenable. This study indicates how much can be done to reduce accidents by considering the human factor as apart from the physical causation of accidents.

E. L. COLLIS.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

## Reviews.

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**PENICILLIN IN WARFARE.** Special Issue of *The British Journal of Surgery*. Bristol: John Wright & Sons, Ltd. London: Simpkin Marshall (1941), Ltd. Price 12s. 6d. net.

This special number of the *British Journal of Surgery* contains 18 papers dealing with the properties of penicillin, the laboratory methods by which its administration should be controlled, and its clinical use in war injuries and venereal diseases. A bibliography of all papers dealing with penicillin published up to the early part of the summer of 1944 is appended.

A foreword by Major-General L. T. Poole, *D.S.O., M.C.*, giving the history of the investigation of penicillin by the Army with admirable conciseness, shows how much the present satisfactory position of penicillin therapy in the Services owes to the enthusiasm with which the new discovery was welcomed by the department which he directs, and the doggedness with which the early obstacles to its distribution and use were overcome.

The first paper, by Florey and Jennings, gives an authoritative and lucid account of the properties of penicillin and the principles of its use in the prevention and control of infection. In the second paper Garrod and Heatley deal with bacteriological technique, describing methods for determining the sensitivity of bacteria to penicillin, for assaying the potency of batches of the drug and for evaluating the amount of penicillin in body fluids and in pharmaceutical preparations.

The clinical papers which follow describe the use of penicillin in soft tissue wounds, in open fractures, in gas gangrene, in penetrating wounds of the chest, head and spinal cord, in a series of American aerial casualties treated at hospitals in Britain, and in venereal disease. The papers on penicillin in gonorrhoea and syphilis, on the wounds of aerial warfare and one of the papers on clostridial infection, are contributed by officers in the medical corps of the United States army.

The introductory papers of this clinical series, by Jeffrey on the surgical aspects and by Scott Thompson on bacteriology are models of concise and practical advice. The two following by Bentley and Mason Brown deal with the early suture of soft tissue wounds. Bentley has relied chiefly on the local instillation of penicillin solution through tubes, while Mason Brown has in most cases sewn up the wounds after an application of calcium penicillin-sulphathiazole powder, reserving tubes for the deep and infected wounds. Both record first intention healing in over 90 per cent of the cases, and in comparing their results with those obtainable before penicillin point out that suture has not alone been more successful, but has been possible in a higher proportion of the cases (56 per cent as against 29 per cent in Mason Brown's series). It is interesting to note in Bentley's cases that a second culture seven days after suture showed that all wounds still contained bacteria and 20 per cent had staphylococci or streptococci.

Jeffrey deals with the general problem of penicillin in compound fractures, Furlong and Clark with a series of 140 fractures of the femur half treated with penicillin and half without, and McEwan and Biskerton with a small series of 12 fractured femurs. These papers are interesting but not convincing. While it is probably true to say, as Jeffrey does, that penicillin has made plating and internal manipulation of the fracture and suture of the wound safe, Furlong's cold figures show the penicillin series in a poor light. Deaths and amputations were less, but these are usually the result of the injury and not of the treatment; on the other hand

secondary hæmorrhage was more common, and persistent sinus and "sumping" much more common, in the penicillin series. It is only fair to qualify this observation by pointing out that fourteen of the penicillin femurs were plated, and none of the control series.

The papers on gas gangrene, on head wounds and on the early prophylactic treatment of wounds sustained in aerial combat, contain no convincing evidence for the superiority of penicillin over sulphonamides in these conditions. Two papers on wounds of the chest, however, by Nicholson and Stevenson and by d'Abreu, Litchfield, and Scott Thompson indicate that penicillin has been of great benefit in sterilizing infected hæmothoraces and in allowing the early closure of large and septic wounds of the chest wall.

The articles on gonorrhœa, by Robinson, and on syphilis by Wise and Pillsbury, are among the most dramatic. Of 1,000 cases of sulphonamide resistant gonorrhœa treated with a course of only 100,000 units of penicillin 947 were cured by the first course, 50 more after a second and only 3 required a third course. Of 100 acute cases 97 were cured by the first course. An interesting observation is that 5 patients developed a positive Kahn reaction two months later, showing that the penicillin course had aborted the primary and secondary stages of simultaneously contracted syphilis.

Only 15 cases of syphilis are reported, a number that justifies no more than the observation that the early results seem to offer possibilities of great importance.

In all the papers there is a healthy insistence on the limits as well as the possibilities of penicillin therapy. The writers are careful to point out that early and adequate surgery is the first need in wound treatment, without which even the most powerful bacteriostatic can avail little. This symposium goes a long way to offset the unfortunate impression of special pleading left by some earlier publications on penicillin, which ignored the excellent results already obtained by other surgeons with sulphonamides and the fact that all their own cases had, in fact, received full courses of sulphonamides as well as of penicillin. Surgeons are presumably intelligent beings who prefer to form their opinions on facts presented to them rather than accept them ready made on the *ipse dixit* of an expert. The *British Journal of Surgery* can be congratulated on making this mass of evidence available to their readers at the present time.

THE SURGERY OF ABDOMINAL TRAUMA. By Geoffrey R. Parker, M.B., B.Ch., F.R.C.S., Major, R.A.M.C. With a foreword by Colonel J. M. Weddell, C.B.G., F.R.C.S., late Consulting Surgeon, A.F.H.Q. London: Messrs. J. & A. Churchill, Ltd. Pp. 120. Price 10s. 6d.

This is a straightforward commentary, written almost in narrative style on 94 operations for abdominal and abdomino-thoracic wounds performed by the author at a field surgical unit during the campaign in Tunisia and Italy, and the author is to be congratulated upon the documentation, which, at times, must have been a burden to him, which has made this book possible. It contains much information of value, especially to those who undertake this type of surgery for the first time, and who find themselves working under conditions far removed from the peaceful surroundings wherein they were trained as surgeons.

The recovery rate claimed by Major Parker—66 per cent.—is a high one, and is a tribute, not only to Major Parker's judgment and skill, but to the efficiency of his team as a whole.

As to the detail in the text, there is little with which one may quarrel. The importance of the high incision for suprapubic cystotomy might have been stressed, and the wisdom of attempting suture of wounds of the posterior wall of the bladder may be doubted. The method advised of stretching the anal sphincter to guard against gas accumulation will certainly not find general support amongst surgeons. A more detailed description of post-operative care would greatly enhance the value of the work as a whole. These, however, are minor criticisms which do not detract from the worth of the book, which does not purport to be a textbook of war surgery of the abdomen.

**AIDS TO CLINICAL PATHOLOGY.** By David Haler, M.B., B.S.(Hons.), Lond., D.C.P., Lond.  
London : Baillière, Tindall & Cox. 1944. Pp. viii + 358. 21 Illustrations. Price 6s.

The Students' Aid Series has in the past earned a worthy reputation among medical students and there are few of us who would not own to have gained from the perusal of one or more of this series. Certain subjects readily lend themselves to presentation in an abbreviated form. It is possible to condense the principles of a subject in a brief outline for novices, but the teaching of the application of the principles is more complicated and is generally not conducive to simple compression.

The author of the volume under review has undertaken a very difficult task in attempting to write within a very small compass a book on such a comprehensive subject. Clinical pathology is the practical application of the principles of pathology, bacteriology, biochemistry, human parasitology, etc., and any book on this subject, be it large or small, must of necessity be a reference book. However much condensation and meticulous care are practised, the small book on clinical pathology can only be small by omission of certain methods and techniques. There is a very definite limitation to the extent to which these omissions can be effected without the book losing balance and value.

This little volume contains a mass of valuable information but it fails in so far as it also contains information that is not reliable and, possibly because of the condensation, much that will mean little to the novice. It is perhaps inevitable that the relative value of the different sections should be unequal, but careful revision of the script would have improved many of these sections.

**A PATHOLOGY OF THE EYE.** Second Edition. By Eugene Wolff, M.B., B.S.Lond., F.R.C.S.  
Eng. London : H. K. Lewis & Co., Ltd. 1944. Pp. vii + 285. Price £2 2s. net.

This little volume is of special interest to R.A.M.C. officers for whom it is primarily written. It will be of value not only to the ophthalmic specialist (even the senior ophthalmic specialist will find it of interest) but also to the general medical officer. One of the best sections of the book contains a simple description of the more common eye troubles seen among troops, outlines the diagnosis, suggests suitable methods of treatment applicable to the M.I. room or the Field such as the average M.O.—no matter how meagre his knowledge of eyes—can readily apply, and gives indications for reference to a specialist.

The ophthalmic sister, also, will find much useful information and instruction in its pages.

The teaching throughout the book is sound, and it is full of those useful little dodges which make all the difference to efficiency in the difficult conditions of war. Of these, many examples could be given—the value of the pin-hole test for visual acuity to differentiate lack of vision due to a refractive error and disease, the estimation of the vision by finger-counting at a distance in the absence of Snellen's types, the undesirability of repeated irrigations, particularly with antiseptics, the sin of bandaging up an eye unnecessarily, the value of keeping open an infected socket by an upper lid strap and so on. The writing is clear and to the point : thus " eye lotions should be poured reverently, like a liqueur, and not like beer from a height." Altogether, the book is a most creditable effort by an officer engaged all the time of writing on strenuous active service and lacking literary facilities and references.

**TEXTBOOK OF ANÆSTHETICS.** Sixth Edition. By R. J. Minnitt, M.D.Liverp., D.A.Eng.,  
and John Gillies, M.C., M.B., Ch.B.Edin., D.A.Eng. Edinburgh : E. and S. Livingstone,  
Ltd. 1944. Pp. viii + 487, 199 illustrations. Price 25s. net.

The appearance of this textbook, an expansion of Ross and Fairlie's well-known Handbook of Anæsthetics which was revised by Minnitt in 1940, is very welcome. As the authors state in the preface, it is no longer a handbook. The change in the title is amply justified by the many excellent additions and it is now a comprehensive textbook and bang up to date.

The pleasant, lucid style carries the reader on and the book is well illustrated with admirable drawings and photographs. The attractive production and lay-out are a credit to the house of Livingstone.

The whole range of general anæsthesia is covered and local and regional anæsthesia for general surgery (by Major L. B. Wevill, R.A.M.C.), and local analgesia in dentistry (by Dr. John Boyes) are dealt with more briefly, but in useful detail. There are no prejudiced views in this book and such dogmatic statements as appear are amply justified. The book is impregnated with the practical and teaching experience of its well-known authors, who are very familiar with the beginner's difficulties and the dangers into which he may run. No one, after studying this volume, can say that he has not been warned, or that he has not been told how to deal with the emergencies he may meet.

There are new chapters on Trichlorethylene, Endotracheal Anæsthesia, Intravenous Anæsthesia and Anæsthesia for Dentistry, and an excellent chapter on Choice of Anæsthetic; one dealing with pathological states in relation to anæsthetic technique has been completely revised. Recent findings on the dangers of trichlorethylene in a closed circuit and of pentothal injected intra-arterially are given and there is a description of the serious and rarely encountered condition of impaction of the epiglottis. The chapter on Accidents of Anæsthesia is particularly good. Analgesia and Anæsthesia in Obstetrics are fully dealt with and there are chapters on Ethylene and on the Therapeutic Use of Oxygen and other gases and a useful and well-illustrated chapter on Posture of the Patient. In the chapter on Clinical Observation of the Patient abnormal phenomena of anæsthesia are well described.

This book will arouse and maintain the student's interest and it will delight the expert, who will want to read it and then to refer to it constantly. The busy authors are to be congratulated on having produced such an excellent work at a time when their leisure must have been very limited. The unified whole is a credit to their collaboration which cannot have been easy for men living in cities so far separated as Liverpool and Edinburgh. There is no doubt that this book is marked for success.

F. B. B.

TREATMENT BY MANIPULATION IN GENERAL AND CONSULTING PRACTICE. Fourth Edition. By A. G. Timbrell Fisher. London: H. K. Lewis & Co., Ltd. 1944. Pp. vii + 224. Price 16s.

"Don't bother me about anatomy" said the old bone-setter Hutton to Dr. Wharton Hood, who was studying his methods. Bone-setters work on the simple, false diagnosis of "a bone out of place" and, by skilful empirical manipulation, they cure many a stiff and painful joint which has resisted the treatment of orthodox medical men. Treatment by manipulation has been in the hands of unqualified bone-setters for centuries and they still do most of it. This clearly is undesirable because the bone-setter sometimes makes dangerous mistakes, particularly in manipulating tuberculous joints, and his treatment is necessarily limited by the lack of anæsthesia. Manipulative surgery should be practised by surgeons who understand the principles involved in manipulation and the scope of this method of treatment. Anyone who disseminates this knowledge amongst the profession is doing a service, but he must step warily. Discussion of this subject should be regulated by a strict scientific discipline to avoid the taint of quackery attached to bone-setting, and the downright deception of osteopathy. A straightforward account is needed of those conditions which may be cured or improved by forced movement, and it should be based on a sound pathology.

I feel that in writing this book Mr. Fisher has not really taken himself in hand. His prose is vague and slipshod and there is too much of it. The descriptions of pathology are sometimes dubious. The methods of treatment which he advocates are in the main acceptable but it is unfortunate that they are not presented with that force and lucidity of which Bankart's writing in his book on Manipulative Surgery is an example which readily comes to mind.

This is the fourth edition of the book. There is some additional material and certain sections have been re-written.

### Notices.

#### HARDEN V.C. MEMORIAL FUND.

IT has been decided to institute a Fund with the above title, the object of which will be to provide help for the wife and two children of Lance-Corporal H. E. Harden, Royal Army Medical Corps, awarded the *Victoria Cross* for conspicuous gallantry in North West Europe (Supplement to *The London Gazette* of Tuesday, March 6, 1945).

Lance-Corporal Harden, V.C., was killed in action on January 23, 1945, and the citation (reproduced elsewhere) of his deeds on that day will go down in the history of the Army and the Corps as a record of one of the most gallant actions ever performed. The Corps will be glad to perpetuate his memory.

Individual subscriptions of small sums from large numbers of the Corps will show how proud we are of him and if any units or formations have surplus funds which are disposable in this way they will be gratefully received.

The Fund will be managed by Trustees at their discretion for the benefit of the dependants of Lance-Corporal Harden, V.C., and subscriptions should be sent to the Secretary, R.A.M.C. Funds, 85, Eccleston Square, London, S.W.1.

Cheques should be crossed "Harden V.C. Memorial Fund."

ALEX HOOD,

*Director-General, Army Medical Services.*

THE WAR OFFICE,  
March 13, 1945.

#### ROYAL ARMY MEDICAL CORPS FUND.

THE R.A.M.C. FUND (to which the majority of officers holding permanent commissions subscribe £1 yearly) consists of (1) the OFFICERS' Branch and (2) the General Relief Branch.

(1) The Officers' Branch keeps up the Corps Band, Memorials and other objects in which the officers of the Corps as a corporate body are interested. It gives a donation to the General Relief Branch annually.

(2) The General Relief Branch, founded in 1900 during the South African War, affords financial assistance to Warrant Officers, Non-Commissioned Officers and Men of the Corps and their families in distress. In 1943 grants amounting to £841 12s. 7d. were made. In 1944 grants to over £1,100 were made. On November 30 the grants were £25 and in December two working days' grants were over £30. This is only to be expected with the rise in the cost of living. When one thinks of what munition workers are said to make, the soldier's wife gets very little and to manage as they do shows them to be a sturdy lot of independent managers. The administrative office seldom deals direct with cases. They are brought to notice by the Soldiers', Sailors' and Airmen's Families Association branches up and down the land. These also co-operate financially.

The Secretary, Lt.-Colonel J. G. Foster, O.B.E., M.B., will be glad to let any Officer Commanding a Unit have details of grants so that both officers and men can have some idea as to how their money is being spent. His address is 85, Eccleston Square, London, S.W.1.

The R.A.M.C. Association was started in 1925 and did magnificent work in job-finding up to the outbreak of war. Colonel Foster is keeping it going so that it can resume its activities on the cessation of hostilities. Its social activities are, naturally, in abeyance. Applications for relief are handed over to the General Relief Branch of the R.A.M.C. Fund.

The R.A.M.C. Officers' Benevolent Society is solely for the benefit of orphans of regular officers in distress.

**ROYAL ARMY MEDICAL CORPS OFFICERS' WIDOWS' AND ORPHANS' FRIENDLY SOCIETY.**

As the above is not an approved society it will not be affected by the proposal in the White Paper on Social Insurance to abolish approved Societies. An approved society is one approved by the Ministry of Health to administer National Health Insurance Benefits.

It cannot, of course, be foreseen what the actual provisions of the Bill will be and how much of the White Paper will be accepted by Parliament. One thing, however, seems certain and that is that this Society, not being an approved one, will not be directly affected.

Generally, both Sir William Beveridge and the White Paper make it clear that they hope and expect individuals will supplement the State benefits by voluntary insurance. Sir William Beveridge in his Report suggested three guiding principles and the third of these was "that social security must be achieved by co-operation between the State and the individual. The State should offer security for service and contribution. The State in organizing security should not stifle incentive, opportunity, responsibility; in establishing a national minimum, it should leave room and encouragement for voluntary action by each individual to provide more than that minimum for himself and his family."

The White Paper says the same thing in paragraph 13: "Benefits must be paid for, and a high level of benefit must mean a high level of contribution. The Government therefore conclude that the right objective is a rate of benefit which provides a reasonable insurance against want and at the same time takes account of the maximum contribution which the great body of contributors can properly be asked to bear. There still remains the individual's opportunity to achieve for himself in sickness, old age and other conditions of difficulty a standard of comfort and amenity which it is no part of a compulsory scheme of social insurance to provide."

D. B. McGRIGOR,  
*Brigadier,*  
*Secretary.*

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Authors are alone responsible for the statements  
made and the opinions expressed in their papers.

# Journal of the Royal Army Medical Corps.

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## *Original Communications.*

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### THE PRINCIPLES GOVERNING THE CURATIVE AND THE SUPPRESSIVE TREATMENTS OF HUMAN MALARIA, WITH SPECIAL REFERENCE TO MILITARY CONDITIONS.

By Brigadier J. A. SINTON, M.D., D.Sc.  
(Consultant Malariologist to the War Office.)

[Received March 3, 1945.]

A LARGE amount of additional knowledge about the chemotherapy of malaria has accumulated since the war started. In spite of this, there appears to exist in some quarters a failure to appreciate the basic principles of such treatment. There is also much uncertainty as to how this knowledge can be applied to the best advantage under the very varied conditions which arise during active military service.

Theoretically, it should be possible to interrupt the cycle of the human malaria parasite from mosquito to man and back again by a direct chemotherapeutic attack upon the Plasmodium in either host. In our present state of knowledge, however, this can only be attempted during the sojourn of the parasite in the human body. The whole of the plasmodial asexual cycle (schizogony) occurs in the vertebrate host, while the sexual development (sporogony) is completed in the mosquito. The only stages of the latter cycle that occur in man are (i) the forms (gametocytes) destined for the initiation of the sporogonic cycle when taken by the mosquito, and (ii) the mature products of the latter cycle (sporozoites), which may give rise to infection when inoculated into man. It is necessary, therefore, to consider in how far these stages of the sexual cycle and the various stages of the asexual one can be affected adversely by the administration of drugs to the human host.

A successful chemotherapeutic attack upon the gametocytes or upon the sporozoites in man would be in the nature of a true *prophylactic* action (i.e. the prevention of the transmission of infection either to the mosquito or to man respectively). On the other hand, an attack upon the different stages of the asexual cycle would be a *curative* action (i.e. treatment of an infection already acquired by the human host). It is convenient, therefore, to consider the use of chemotherapeutic agents in man from (i) the *Prophylactic* standpoint and (ii) from the *Curative* one.

#### DEFINITIONS OF THE TERMS USED TO DESCRIBE THE CHEMOTHERAPEUTIC ACTIONS OF ANTI-MALARIAL DRUGS.<sup>1</sup>

Much confusion and controversy have resulted in the past because of varied meanings applied to the same terms in malaria therapy. It is most essential, therefore, that exact definitions should be given to the terms used.

<sup>1</sup> These definitions are discussed more fully by Sinton (1937) and Sinton *et al.* (1939).



# I.—TERMS USED IN DESCRIBING CHEMOTHERAPEUTIC MEASURES AIMED AT THE TRUE PROPHYLAXIS OF MALARIAL INFECTION.

## (A) *Prophylaxis of the Passage of Infection from the Human to the Insect Host (Gametocyte Therapy).*

(1) *Direct gametocyte prophylaxis* is the prevention of the development of infection in the insect vector by the direct destruction, sterilization, or devitalization of the gametocytes before they leave the human host:

(2) *Indirect gametocyte prophylaxis* is a reduction in the infectivity of the human host because of a *temporary* diminution in the number of gametocytes, or a *temporary* elimination of these forms from the peripheral blood, through the destructive action of anti-malarial drugs upon the asexual parasites from which they are derived.<sup>1</sup>

(3) *Eventual gametocyte prophylaxis* is the *permanent* elimination of gametocytes from the peripheral blood by the complete eradication of the schizogonic forms from which they originate.<sup>1</sup>

## (B) *Prophylaxis of the Passage of Infection from the Insect to the Vertebrate Host (True Causal Prophylaxis)*

(1) *True Causal Prophylaxis*.—The complete prevention of the development of any schizogonic blood forms as the result of the radical destruction of all introduced sporozoites (or of any hypothetical stages between the latter and the former),<sup>2</sup> i.e. the prevention of infection in man.

# II.—TERMS USED IN DESCRIBING CHEMOTHERAPEUTIC MEASURES AIMED AT THE CURE OF INFECTION OR ITS MANIFESTATIONS.

(1) *Suppressive Treatment*.—The prevention of the development of the clinical manifestations of sub-patent infections by means of continued drug treatment.

(2) *Clinical Cure*.<sup>1</sup>—The cure of clinical manifestations should these develop.

(3) *Radical Cure*.<sup>1</sup>—The permanent elimination of the infection by the destruction of all those forms of the parasite that are capable of continuing the asexual (pathogenic) cycle in the human host, i.e. permanent prevention of relapses, either clinical or parasitic.<sup>3</sup>

<sup>1</sup> So far as is known, gametocytes are derived primarily from the blood schizogonic forms of the Plasmodium, and so are liable to be regenerated so long as infection continues. (It is unknown what part the exo-erythrocytic stages seen in avian malaria and hypothesized in mammalian malaria play in their development.)

In the absence of *radical* cure, the effects of gametocytocidal drugs are only temporary, and these forms tend to reappear when the temporary action of the drug has passed off. In our present state of knowledge, there appears to be no hope of achieving a permanent disappearance of gametocytes from the peripheral blood, and so the elimination of actual and potential malaria carriers, unless at the same time the infection is eradicated.

The term "cure" is used in a very loose sense by many writers on malarial therapy. It is essential that it should always be clearly indicated whether it is intended to mean *radical* cure (i.e. a complete eradication of infection), or merely *clinical* cure (i.e. only abolition of those clinical manifestations of infection present at the time when treatment commenced). While many clinical cures may at the same time be radical ones, more especially in M.T. infections treated by modern methods, there is at present no means of determining whether the latter effect has been achieved except by prolonged post-therapeutic observation. In the case of M.T. infections, the absence of attacks for three months after the cessation of *all* forms of anti-malarial treatment usually indicates a radical cure, but with B.T. the infections in some instances may remain latent and attack-free for periods of nine to twelve months in the absence of radical cure.

<sup>2</sup> So far there is no conclusive proof that such hypothetical forms (cryptozoites) exist in the cycle of any mammalian Plasmodium. If such forms are found to occur, it may be necessary to divide "true causal prophylaxis" into two stages, (a) *sporozoite causal prophylaxis*, and (b) *cryptozoite causal prophylaxis*, for scientific convenience. Or it might be better to consider the occurrence of cryptozoites as an early stage of infection, and classify the treatment against such forms as a "curative" rather than a "prophylactic" measure. This would mean that curative methods (*vide infra*) would require to be divided into (a) attack on tissue forms (cryptozoites), and (b) attack on blood forms (trophozoites, etc.).

<sup>3</sup> Relapses may be of two types—(i) *Parasitic* ones discovered by blood examinations, and (ii) *Clinical* ones revealed by disease manifestations. The discovery of parasites in the peripheral blood is not always accompanied by clinical effects. The provocation of a clinical attack depends upon the number of parasites required to produce such pathogenic effects (i.e. the *pyrogenic threshold* of the strain or species of parasite) in the infected individual at the time of the attack. This may vary periodically in the same person. It is also influenced by certain basic factors such as (i) the natural individual or racial tolerance of the infected person (e.g. African adults appear to have a much higher tolerance than have Aryans), and (ii) the degree of immunity or tolerance acquired as the result of the present or previous infections (Sinton *et al.*, 1931; Sinton, 1935).

If there was available any drug or combination of drugs that in non-toxic dosage was capable of producing all the therapeutic actions mentioned above, it should be possible, theoretically at least, to eradicate malaria. Unfortunately, we do not know of any such drug, or system of treatment, which can be used as a true causal prophylactic; nor do we know of one which can be guaranteed to produce by a single course a radical cure in all malarial infections, although with some types of infection a very high percentage of such cures can be obtained.

#### THE PARASITICIDAL ACTION OF ANTI-MALARIAL DRUGS IN RELATION TO THE PREVENTION AND CONTROL OF MALARIA.

Having defined the terms to be used, it is necessary to consider the various proven actions of the commonly used anti-malarial drugs in relation to their employment under military conditions. The following table gives a summary of the chief actions of the three common drugs—quinine, mepacrine (atebrin) and pamaquin (plasmoquine).

TABLE SHOWING THE ACTIONS OF CERTAIN ANTI-MALARIAL DRUGS UPON THE BLOOD  
STAGES OF THE MALARIAL PARASITES.

Drugs	Asexual Parasites <sup>1</sup>				Sexual Parasites <sup>1</sup>			
	B.T.	Ov.	Qt.	M.T.	B.T.	Ov.	Qt.	M.T.
Quinine	.. x x x	x x x	x x x	x x x	x x x	x x x	x x	0
Mepacrine	.. x x x	x x x	x x x	x x x	x x x	x x x	x x	0
Pamaquin	.. x x	?	x x	0	x x x	x x x	x x x	x x x

Notes.—x x x indicates a very great destructive action; x x a less marked action; 0 an absence of destructive action; and ? absence of precise information.

#### I.—TRUE PROPHYLACTIC ACTION OF ANTI-MALARIAL DRUGS.

##### (A) *The Prevention of the Acquisition of Infection by the Mosquito (Gametocyte Prophylaxis).*

(1) *Direct Gametocyte Prophylaxis.*—Both quinine and mepacrine have a *direct* destructive action upon the sexual forms of B.T., Qt., and ovale parasites,<sup>2</sup> but none upon the gametocytes (crescents) of M.T.<sup>2</sup> On the other hand, pamaquin (plasmoquine) destroys or devitalizes the gametocytes of all four forms of human malaria parasites. For these reasons, apart from any adjuvant action to the radically curative effects of the other anti-malarial drugs (*vide infra*), it is unnecessary to give pamaquin in infections other than M.T.<sup>2</sup> if such drugs are being used. It must be remembered, however, that so long as the infection is not radically cured, these sexual forms will be liable to reappear in the peripheral blood after treatment ceases, i.e. such uncured cases will always be actual or potential gametocyte carriers, and at some later period, may spread the disease to the mosquito.<sup>3</sup>

(2) *Indirect Gametocyte Prophylaxis.*—Any of the anti-malarial drugs which act upon the schizogonic forms will reduce, temporarily, the number of gametocytes being poured into the peripheral blood by destroying their precursors (i.e. the schizogonic forms).<sup>3</sup> For this reason all the ordinary curative treatments with quinine or mepacrine, have an indirect gametocyte prophylactic action, even in M.T. infections. This action is very apparent when mepacrine suppressive treatment is properly taken.

(3) *Eventual Gametocyte Prophylaxis.*—It is only after the establishment of a radical cure by any means that the reappearance of gametocytes at a later date can be prevented after all treatment is discontinued completely.

<sup>1</sup> For ease of reference in this article, benign tertian infections (*P. vivax*) will be indicated as "B.T.," quartan infections (*P. malariae*) as "Qt.," malignant tertian infections (*P. falciparum*) as "M.T." and ovale infections (*P. ovale*) as "Ov."

<sup>2</sup> It has been reported that pamaquin (plasmoquine) in doses even as small as 0.01 gram twice weekly will suffice to reduce crescents to a very low level of infectivity among native populations not treated by other means.

<sup>3</sup> See footnote<sup>1</sup> on page 148.

The proper use of any of these methods will have an important influence on the spread of malarial infections in the field. The numbers of gametocytes developed has been found to be proportional to the intensity of schizont prevalence (*see* references in Sinton, 1938). The greatest numbers in B.T. and ovale infections occur during the acute attack, while with M.T. the peak is reached about seven to ten days after the maximum schizont prevalence. In the case of the former infections, adequate clinically curative and suppressive treatment will reduce the production of gametocytes to a very low and probably non-infective level, because of both direct and indirect gametocytocidal action. On the other hand, quinine or mepacrine have little or no *direct* action on the formed gametocytes of *P. falciparum*, although by their *indirect* action they can cause a great reduction in the numbers produced (Sinton, 1938). This is very evident with mepacrine suppressive treatment. For this reason, it may be advisable after treating an attack of M.T. malaria to give a few doses of pamaquin to cause a rapid direct destruction of any crescents which have escaped indirect effects of the clinical treatment.<sup>1</sup>

(B) *The Prevention of the Acquisition of Infection by the Human Host (True Causal Prophylaxis).*

So far no drug has been discovered which, in non-toxic dosage, will prevent the acquisition of infection by a susceptible human host after being bitten by an infective mosquito, i.e. no true causal prophylactic drug is known which is possible of practical application in human malaria. Some drugs, such as mepacrine, which were at one time claimed to have this property in M.T. malaria, have been shown to exert their action *not* upon the sporozoites (or cryptozoites), but upon the schizogonic forms which eventually develop from the former type of parasite, i.e. a curative action upon an established infection.<sup>2</sup>

## II:—CURATIVE ACTION OF ANTI-MALARIAL DRUGS.

It is an axiom that unless a drug is taken, retained and absorbed, one cannot expect to get its optimal effects in the body. It is not sufficient merely to order a drug, or to hand it to the patient, asking him to take it. Steps must be taken to see that the prescribed administration is carried out. The supposed failure of proven remedies is too often due to a failure to *ensure* that these conditions are strictly complied with (*see* Sinton, 1930).

The two main drugs used in the routine therapy of malaria, whether clinical or suppressive, are quinine and mepacrine. It is necessary to know certain details about their pharmacology before one can employ them to the best advantage under different conditions.

Both drugs are rapidly absorbed when given orally, and quinine quickly reaches a high blood concentration. On the other hand, with mepacrine much of the drug is taken up by the other tissues, and it requires several days before an optimum effective blood concentration can be reached by the usual routine curative dosage.<sup>3</sup> For this reason with such dosage the

<sup>1</sup> A couple of daily doses of 0.02 gram of pamaquin will probably suffice for this purpose.

<sup>2</sup> If patients already infected with *P. falciparum* continue to take the proper dosage of suppressive mepacrine for several weeks after the last risk of infection has passed, the majority will be radically cured, although they may never have shown any clinical signs of infection. It was this reason that caused some workers to claim that mepacrine could act as a true causal prophylactic against M.T. malaria. If, however, mepacrine is stopped within a week after infection has been acquired, attacks of the disease will occur later in most instances. It has also been shown by blood inoculation, and sometimes by blood examination, that during the early periods after the passage of infection, the blood of such persons contained asexual parasites even although mepacrine is being taken. It is evident, therefore, that although the results may simulate a true causal prophylaxis the action of the drug is upon the schizogonic forms and *not* upon the sporozoites or cryptozoites, i.e. it is a curative effect and not a prophylactic one. Unfortunately no such remarkable beneficial effect is produced in the case of B.T. infections, in which relatively few more are radically cured by such an extension of suppressive treatment, although large numbers may be rendered latent for several months. These undetected infections may appear at most inopportune moments and constitute a serious military problem.

<sup>3</sup> It is on account of this slow "build-up" of blood concentration that mepacrine suppressive treatment is better started some weeks before the risk of infection occurs, or alternatively larger "loading" doses should be given a shorter time previously to achieve the same result. Similarly, to produce rapid clinical effects comparable with those caused by quinine, the dosage of mepacrine during the first two days may need to be increased to 0.6 to 0.8 gram daily, if quinine is not used.

clinical action of quinine has often been found to be more rapid than that of mepacrine.<sup>1</sup>

Quinine is, however, excreted much more rapidly than is mepacrine, so the therapeutic action of the latter drug may continue for a considerable period after the last dose. It is for this reason that, in the absence of radical cure, relapses are liable to occur sooner after the cessation of quinine treatment than after mepacrine. It has been upon such early results that some workers have reported that certain treatments with quinine and pamaquin are less effective in the radical cure of chronic B.T. infections than are mepacrine ones. More prolonged observation has in some cases shown the reverse to be true.

#### (A) *Suppressive Treatment.*

(1) *Quinine.*—In the past it has been reported from many parts of the world that the clinical manifestations of malaria can be largely suppressed in the majority of individuals by doses of 5 to 6 grains of quinine daily.<sup>2</sup> More recent experience tends to show that such good results can only be expected (i) when the action of the drug has been reinforced by some degree of immunity, either natural or acquired; or (ii) when the exposure to infection is not very severe or is mainly seasonal; or (iii) when the chief infection is B.T. On the other hand, it has been found that when non-immune individuals are exposed to severe malarial infections, such doses of quinine are insufficient to keep all attacks of malaria suppressed over long periods, although they will diminish the clinical severity and frequency of these attacks. The increased dosage needed to achieve the high degree of suppression produced by mepacrine (*vide infra*) would, in these circumstances, be too high to be tolerated by the soldier while performing his normal duties efficiently.<sup>3</sup>

(2) *Mepacrine.*—With mepacrine we have now a drug which in easily tolerated dosage will suppress the effects of repeated heavy infections and superinfections with either M.T. or B.T. or both. To obtain these effects, the drug should be given in a dosage of 0.1 gram every day of the week without fail. The recipient quickly becomes habituated to this amount of the drug, and it does not interfere with his normal duties, either physical or mental.

The statistics recently reported from very highly malarious areas in New Guinea show that, with the proper enforcement of such mepacrine suppression, a military force can maintain itself in the field with a very low malarial attack incidence. This is possible under conditions where, without the proper use of this drug, malaria would put the force out of action within a few weeks.

Much evidence had been accumulated in the field from all parts of the world during the past few years to indicate very strongly that, when properly and regularly taken, mepacrine would ensure a very low malarial incidence under active service conditions. Now the brilliant experiments carried out in Australia have proved conclusively that any supposed failure to suppress is mainly, probably entirely, due to a failure to carry out the routine ingestion of the drug without any intermissions. Very severe tests designed to simulate as closely as possible the conditions of heat, cold, fatigue, mental strain, poor and inadequate nourishment, etc., likely to be encountered on active service, failed to overcome the suppressive action of this drug when given in doses of 0.1 gram daily. Attacks only occur when for some reason, intentional or unintentional, there has been some interruption in the daily ingestion of the drug.<sup>4</sup>

The occurrence of malarial attacks among groups of persons ordered routine mepacrine suppression can be regarded as *prima facie* evidence that the drug is not taken regularly as ordered. This failure to take mepacrine properly is sometimes due to carelessness or forgetfulness, but some individuals deliberately avoid the treatment in the hope that a resulting

<sup>1</sup> The ordinary routine doses for clinical treatment are 30 grains (2 grams) of quinine daily in solution, or 0.3 gram mepacrine daily in tablet form.

<sup>2</sup> See Sinton (1936) (pp. 134-145).

<sup>3</sup> The question of quinine dosage is discussed by Sinton (1930).

<sup>4</sup> The routine in the Australian Forces is that a man who, for any reason, has failed to take a tablet of mepacrine on one or more days will take an additional tablet of mepacrine on each day following, until the same total number that were missed have been taken (e.g. if three tablets are missed, two will be taken daily for the next three days).

malarial attack will secure them a period of absence from the perils and discomforts of the forward area or even leave or invaliding outside the theatre of operations. The results of suppression in any unit depends upon the strictness with which the administration of mepacrine is supervised and enforced and, in such circumstances, a high malarial incidence is certain evidence of poor anti-malarial discipline.

As pointed out earlier, mepacrine has no true causal prophylactic action but is merely a suppressive. For this reason, if the treatment is stopped immediately after leaving a malarious area, many of the suppressed infections will soon develop into acute clinical attacks of the disease. On the other hand, it has been found that, in the absence of reinfection, if mepacrine be continued in the same dosage for about four weeks after leaving a malarious area, a *radical* cure will have been achieved in practically all cases of M.T. infection. It is otherwise in the case of B.T. infections.<sup>1</sup> While some of the latter may be cured by suppressive treatment, a considerable number may be expected to break out after treatment is stopped. Some may appear within a few weeks, while many may remain latent for many months or even as long as a year.<sup>2</sup>

The beneficial effects of mepacrine suppression may be summarized as follows :—

(a) Diminution in morbidity, and so a great conservation in man-power and efficiency, both physical and mental ; (b) reduction in the severity of clinical attacks, and so, (c) reduction in mortality ;<sup>3</sup> (d) diminution in the number of gametocyte carriers of all species of parasites and so a reduction in the source of infection to mosquitoes ; (e) radical cures of many infections, especially M.T. ones, when the treatment is prolonged ; (f) diminution in the tendency to blackwater fever and to post-malarial anæmia ; (g) assistance to the body in building up a resistance to malaria, which will tend to diminish the frequency and intensity of clinical attacks and also help the action of anti-malarial drugs (Sinton, 1939).

There is no doubt that mepacrine is the best drug we have at our disposal for suppressive treatment among troops. Not only is it a better suppressive than quinine, but is easier to take, does not produce cinchonism, and does not interfere with either the mental or bodily activities of the recipient.

#### (B) *Clinical Cure.*

The chief drugs of value in the cure of the clinical manifestations of malaria are quinine and mepacrine ; pamaquin has no place in such treatment. With the appropriate doses of these drugs, a clinical cure is usually a relatively easy matter. This is especially the case in relapses of B.T. malaria, many of which tend to run to spontaneous recovery even in the absence of treatment. In acute attacks of M.T. malaria, it is usually necessary to give relatively larger initial doses of mepacrine than of quinine to obtain a quick result.<sup>4</sup>

In ordinary cases of malaria, if the diagnosis be made early and specific treatment started promptly, the damage to the patient's health is relatively slight ; the necessary period of absence from duty should be short, unless after severe attacks of M.T. malaria or when blackwater fever or some other complication occurs. Long continued untreated or insufficiently treated malarial infections may eventually lead to considerable anæmia and debility. Such cases should be very rare or absent when proper treatment is given, and more especially when mepacrine suppression is in use.

<sup>1</sup> See footnote<sup>1</sup> page 148.

<sup>2</sup> Among troops returning from the Mediterranean area, at least 5 to 6 per cent developed subsequent attacks of B.T. malaria, often after a quiescent interval of five to six months or longer. In the tropics, where the infection rate is much higher, the incidence of such attacks will be much greater, but some reports seem to indicate that the majority of these will reveal themselves very shortly after suppression is stopped, and that relatively few will have long periods of latency.

<sup>3</sup> In highly malarious areas during the last war from 5 to 15 per 1,000 of malaria cases admitted to hospital died, as compared with a rate of only 1 per 3,000 reported by the Australians from the S.W.P. area. Very much of this decrease is attributed to mepacrine suppression.

<sup>4</sup> See footnote<sup>3</sup> on page 150.

(C) *Radical Cure.*

Some workers believe that malarial infections cannot be cured radically by chemotherapeutic means alone, but that, until some immunity is developed by the infected person to assist the action of the drugs, the infections will linger on and relapse for very long periods.<sup>1</sup> For this reason it is sometimes recommended that the treatment of attacks should be separated from that which aims at radical cure.

While it is recognized that the presence of some degree of immunity, either natural or acquired, may be of great help in producing a radical cure, it is now proven that quite a high proportion of malarial infections can be cured radically in the absence of any appreciable degree of acquired immunity<sup>2</sup> (e.g. the radical cure of early M.T. infections by mepacrine). Other factors being equal (*vide infra*), modern practice is to attempt to obtain both a clinical and a radical cure by the same course of a treatment of short duration.

*Routine prolonged* treatment which aims at the production of a very high percentage of radical cures in *all* cases, irrespective of the type of infection, does not appear justifiable in Army practice during war, either from the point of view of the patients, the loss of man-power involved, the expense, and the supervision required. In primary attacks the course should be as short as possible, consistent with a high radical cure rate in the predominating infection. While it is admitted that prolonged courses of treatment will produce in most cases a higher radical cure rate, the benefits derived from them are not proportionate to the loss of man-power, etc., involved in implementing them (*see* Sinton, 1930).

Owing to the difficulty which the clinicians may encounter in obtaining an immediate diagnosis of the species of parasite responsible for the infection and the common occurrence of undetected mixed infections, some *standard course of treatment* should be laid down which will produce a rapid clinical cure, and, if possible, at the same time, a radical cure of the majority of the infections encountered in the area. The short standard courses of treatment advocated in the Army have proved capable of effecting rapid clinical cures against both B.T. and M.T. malaria, and in producing a very high rate of radical cure in the latter type of infection (usually more than 90 per cent with a single course of treatment). Unfortunately, these are less successful against some types of B.T. infections in which a considerable proportion (even up to 50 per cent) may relapse later.

While such B.T. infections are very easily cured clinically, and attacks can easily be prevented by continuing suppressive treatment,<sup>3</sup> a relatively high proportion relapse again when such treatment is discontinued. Such relapsing cases form a serious military problem, because no one course of any of the standard Army treatments has been found to produce a high radical cure rate. These chronic B.T. cases require special types of treatment,<sup>4</sup> and although several new drugs and intensive types of treatment with mepacrine have been tried, so far they have not solved the problem. Some workers state, however, that when the action of pamaquin (plasmoquine) is combined with that of quinine or mepacrine, the relapse rates in both B.T. and M.T. malaria are reduced.<sup>5</sup> Some recent work on chronic B.T. malaria of

<sup>1</sup> In the absence of reinfection, M.T. infections seldom relapse after one year; B.T. infections usually disappear after two to three years, but Qt. infections may persist for many years. Clinical relapses in ovale infections are practically unknown.

<sup>2</sup> This question has been discussed more fully by Sinton (1935a, 1939).

<sup>3</sup> Some physicians recommend that the clinical curative treatment of such cases should be followed up by a "maintenance course" of therapy. This is called a "treatment to prevent relapses." It is merely a suppressive treatment, and relapses must be expected to recur when it is stopped. Although the immunity which is developing while such treatment is in progress (*see* Sinton, 1939) may assist in the production of a radical cure eventually, the beneficial effects produced are not sufficient to compensate for the difficulties of its strict administration under most military conditions. When given in the form of the ordinary routine suppressive treatment and *not* in the form of *individual* attempts at radical cure or suppression, such a scheme is of considerable importance under certain military conditions (*vide infra*).

<sup>4</sup> Pre-war experience in India reported highly favourably upon the radically curative effects of the simultaneous administration of quinine and plasmoquine in the treatment of chronic B.T. infections (*see* Sinton *et al.*, 1930; Sinton, 1930; Manifold, 1931; Dixon, 1933; Amy and Boyd, 1936; *et al.*). Recent controlled trials in this country tend to support this claim.

<sup>5</sup> The reported benefits of the combined plasmoquine treatments are discussed in the 4th General Report of the Malaria Commission of the League of Nations (1937), (pp. 940-954).

Mediterranean origin supports the view that a higher radical cure rate in such infections can be produced by a combination of quinine and pamaquin than with any other form of treatment tried.<sup>1</sup>

#### THE PRACTICAL APPLICATION OF THE PRINCIPLES OF MALARIA THERAPY TO THE CONTROL OF THE DISEASE UNDER MILITARY CONDITIONS.

The recognized actions of anti-malarial drugs must be applied differently to obtain the best effects under the varied conditions of military service.

##### I.—TRUE CAUSAL PROPHYLAXIS.

So far we know of no drug which it is practicable to use in non-toxic doses to produce this effect. If such a drug were available, to be satisfactory under military conditions, it should not only be a true causal prophylactic against all species and strains of parasite, but should also have a curative action to ensure that the results of any failure to take the drug in adequate dosage, with consequent contraction of infection, would be overcome by its later curative or suppressive actions.<sup>2</sup>

##### II.—GAMETOCYTE PROPHYLAXIS.

With the proper use of mepacrine suppressive treatment, gametocyte carriers should not be a serious problem among troops. When such treatment is not in use in a potentially malarious area, it may be advisable in M.T. infections to give a couple of small doses of pamaquin after the completion of a course of treatment to devitalize any crescents which have not been affected by the other drugs used.

Gametocyte prophylaxis may also be used in reducing the number of carriers among indigenous populations living continually in close contact with troops—a condition to be avoided. But here it is probable that the use of mepacrine suppression would be better, as it would not only act as an indirect gametocytocidal agent against crescents, but a direct one also against the gametocytes of B.T. and Qt. At the same time it would reduce the number of those acute attacks which are followed by showers of gametocytes into the peripheral blood.

##### III.—CURATIVE MEASURES.

(1) *Suppressive Treatment.*—As emphasized above, mepacrine suppression is the most important means of *controlling* the results of infections in malarious, and especially highly malarious, regions. It must always be stressed that such treatment is not the solution of the problem of malaria prevention, but is only a means of *controlling* the ravages of the disease temporarily. When such treatment is discontinued, a large number of attacks must be expected, and these may occur at most inopportune moments thus upsetting or delaying important operational preparations. The mere fact that troops on suppressive treatment have a low malarial sick rate must never be taken as a justification for any relaxation of other measures of personal protection against the acquisition of infection (i.e. against mosquito bites). Indeed, the need for the use of suppressive treatment is a certain indication of severe risks of infection and therefore for the even stricter enforcement of all measures of personal protection.

The occurrence of numbers of malarial attacks in any unit or formation ordered mepacrine suppressive treatment is clear evidence that the drug is not being taken properly. The occurrence of a heavy malarial incidence after such treatment is stopped is definite proof that measures of personal protection have not been adequately enforced during the period of exposure to the risk of infection.

<sup>1</sup> See footnote 4 on page 153.

<sup>2</sup> An ideal prophylactic would be one in which these effects lasted for weeks or even months after a single dose or course of treatment.

(2) *Clinical Treatment*.—The treatment should be such as will produce as rapid a curative effect as possible, thus not only reducing the period of disability but also the effects of the attack upon the patient's health. As clinical cures can be produced very rapidly in uncomplicated cases of malaria, arrangements should be made to treat all these as close to their units as possible, in order to avoid the great wastage of man-power and the prolonged periods of absence from duty which result when patients are evacuated to more distant places. The establishment of Forward Treatment Units should do much to prevent this.

If mepacrine suppressive treatment is being taken properly and attacks treated quickly when they develop, the effects upon the patient's health should be very small and, in the absence of complications, of short duration. Few cases should require evacuation and the numbers invalided should be negligible.

(3) *Radical Curative Treatment*.—When this effect is indicated (*vide infra*) the course of treatment should be as short as possible consistent with a relatively high cure rate. Prolonged routine treatments in attempts to obtain a slightly higher radical cure rate are to be deprecated, save in exceptional circumstances.

#### IV.—GENERAL OUTLINES OF THE PRACTICAL APPLICATION OF MALARIA THERAPY UNDER DIFFERENT CONDITIONS OF MILITARY SERVICE.

The most appropriate method for the control of malaria in the field by therapeutic measures will vary with the type of individual involved, the intensity of the malarial risk, and the probable duration of exposure to such risk.<sup>1</sup>

##### (A) *Non-infected Individuals Coming to Reside in an Area where the Chances of Acquiring Infection are Relatively Slight.*

If local conditions are such, either naturally, or as a result of anti-mosquito measures, that the individual is only likely to become infected or reinfected at long intervals, there appears to be no object in subjecting him to the tedium of suppressive treatment, nor to the discomfort of repeated attacks, in an endeavour to raise his immunity, as advocated by some workers (*see Sinton, 1939, p. 209*).

In such circumstances the aim of therapy should be to produce a rapid clinical cure of the attack and a radical cure of the infection at the earliest moment by as short a treatment as possible. The ordinary standard courses advocated by the Army should achieve this result in the very great majority of M.T. infections and in a large number of fresh B.T. ones. In the former type of infection it may be necessary occasionally to give a few doses of pamaquin for the direct destruction of any sexual forms not affected by the quinine or mepacrine treatment. Pamaquin is unnecessary for this purpose in B.T. or Qt. infections, although sometimes needed as an adjuvant to radically curative treatment. Relapsing infections should be specially treated along the lines advocated above.

##### (B) *Individuals Coming to Reside in a Non-malarious or only Slightly Malarious Area from a Highly Malarious One.*

*In all cases the routine mepacrine suppressive treatment in force in the highly malarious area should be continued without intermission for at least four weeks after the last chance of acquiring infection has passed.* This should eradicate most of the M.T. infections which are so dangerous to life and the protean manifestations of which are so liable to be overlooked in non-malarial areas with fatal results.

The treatment policy to be adopted will depend upon the probable duration of the sojourn of the individual or formation in the less malarious region.

(1) *Period of Absence from Heavy Risk of Infection likely to be of long Duration*.—If the absence is likely to be six months or more, suppressive treatment should be stopped in most instances. It may, however, be continued *temporarily* in the case of key personnel or units

<sup>1</sup>These factors have been discussed in greater detail by Sinton (1935a), (1937) and (1939).



among whom at the time any heavy sickness incidence would seriously interfere with military operations. Its continuation may also be needed when, in the progress of active operations, troops pass from a highly malarious area to a less malarious one, or the annual break in malarial incidence is only for a short interval.

It must be remembered, however, that there is no evidence that the prolonged continuation of suppression is likely to produce radical cures of B.T. infections (i.e. the chief relapsing disease after suppression stops) in numbers proportionate to the trouble needed to continue the treatment in non-malarious areas. The majority of persons still infected with this parasite will relapse when treatment stops, so the sooner they develop signs of infection (if this does not interfere with urgent military considerations) the sooner can appropriate radical treatment be started. So long as suppressive treatment is continued so long will the potential sick rate in the unit be masked and impossible to evaluate. Such masked infections may break out at critical moments after suppression is stopped:

(2) *Period of Absence from Risk of Heavy Infection of Short Duration.*—If the period of absence is likely to be of relatively short duration, as in the case of troops returning for rehabilitation, re-equipment, refresher training, etc., or if only a short interval occurs in the transmission season, the suppressive treatment should be continued without intermission as in the highly malarious area.<sup>1</sup> If such treatment be stopped, the troops will be liable to develop attacks of malaria, mainly B.T., which may interfere seriously with their activities and delay their return to active field duties.

It is a waste of time to stop suppressive treatment in such circumstances, and to allow attacks to develop in order to give radical treatment, because many of these men are likely to become reinfected within a short time after their return to a dangerous malarious area, so undoing the effects of radical treatment. At the same time, it is probable that the suppressed infections will help the individual to develop a considerable degree of immunity which, with the aid of the suppressive treatment, will make him less liable to get disabling attacks in the future ("immunization without risk") (see discussion by Sinton, 1939).

Patients who develop ordinary attacks need only receive a short course of treatment sufficient to produce a rapid clinical cure, and should then immediately resume suppressive treatment without any interval between.<sup>2</sup> No more prolonged treatment should be used in an attempt to produce a radical cure, because M.T. infections will be radically cured by the continued suppression and B.T. ones will be effectively suppressed.

Patients who develop blackwater fever, or in whom some other serious complication develops, will require special treatment. In the former instance, at least, they should not be allowed to return to a highly malarious region.

If M.T. cases treated in a potentially malarious area show crescents after finishing curative treatment, a couple of small doses of pamaquin at the end of the course should be sufficient to render these non-effective.<sup>3</sup>

(C) *Individuals Exposed to Constant and Frequent Infection, and Reinfection and Super-infection.*

It is well known that the indigenous inhabitants of highly malarious regions, especially those of aboriginal and not of immigrant stock, have often developed a high degree of tolerance to the effects of malarial infection by the time they have arrived at adult age. Apart from any natural immunity, much of this has been acquired as the result of repeated infections lasting over very many years. Even this high degree of tolerance may be broken to some extent when the individuals are translated to new environments, where they are attacked by different strains and species of parasite.<sup>4</sup> In the latter circumstances, however, the effects of

<sup>1</sup> Individuals who under these conditions develop repeated attacks of malaria, should be strongly suspected of avoiding routine suppressive treatment, and, whether officer or man, should be placed under strict supervision and observation to ensure that the drug is taken and retained.

<sup>2</sup> See footnote <sup>1</sup> on page 151.

<sup>3</sup> See footnote <sup>1</sup> on page 150.

<sup>4</sup> The question of treatment in such indigenous populations is more fully discussed by Sinton and Harbhagwan (1935) and Sinton (1935).

malaria are usually very much less severe than in non-immune individuals, and a substantial degree of tolerance to the new strains is developed relatively rapidly. It is otherwise in the case of non-immune populations coming from areas where malaria is absent or much less severe. In the case of troops it is necessary to differentiate these two types of individuals.

(1) *Immune or Salted Populations*.—While African and other aboriginal troops from highly malarious regions may have a high degree of tolerance to the effects of their own local strains of parasite, malarial sickness may become much more evident when such people are transferred to a foreign environment. Any increase usually appears shortly after exposure to the new infecting strains. Smaller doses of mepacrine (say a total of 0.4 gram weekly) will probably suffice to reduce attack incidence to reasonable levels, should the increase be of such magnitude as to justify its use. After such troops have become acclimatized to local conditions, suppressive treatment is usually no longer necessary.<sup>1</sup> Any clinical attacks of the disease that develop are usually mild in character and their treatment should aim at a rapid clinical cure *not* a radical one. A radical cure will tend to diminish the beneficial immunity enjoyed because it will tend to eradicate the stimulus of continued infection which is necessary to maintain this at a high level (Sinton, 1939).

(2) *Non-immune or Semi-immune Troops*.—Such troops always suffer very severely when introduced into highly malarious areas. For therapeutic malarial control, these individuals should be given full doses of suppressive mepacrine during the whole period of residence in the dangerous region and for four weeks after leaving. If the malaria is seasonal there should be no break in the continuity of suppressive treatment, unless the intermission in the period of malarial transmission lasts more than six months.

Attacks should be treated to produce as rapid a clinical cure as possible, followed by an *immediate* resumption of suppressive mepacrine. As such individuals are exposed to the continued risk of early and frequent reinfection, attempts at radical cure by more prolonged treatment are a waste of time so long as they continue to reside under these conditions. The later treatment of such infections has been discussed above.

#### SUMMARY OF THE APPLICATIONS OF THE PRINCIPLES OF MALARIA THERAPY UNDER DIFFERENT CONDITIONS OF MILITARY SERVICE.

##### A. *Non-infected Individuals Coming to Reside in an Area where the Chances of Acquiring Malarial Infection are slight.*

- (1) No suppressive treatment.
- (2) Primary acute attacks—rapid clinical cure combined with radical treatment of short duration; occasionally gametocyte therapy for M.T. infections.
- (3) Relapsing Infections—(a) Repeat standard course; (b) chronic B.T.—special treatment.

##### B. *Individuals Coming to Reside in a Non-malarious or Slightly Malarious Region from a Highly Malarious One.*

- (1) *If the Period of Absence from Heavy Risk of Infection is likely to be of Long Duration.*
  - (a) Stop suppressive treatment after four weeks (except perhaps among certain special personnel).
  - (b) Primary acute attacks—not only rapid clinical cure but especially a radical one.
  - (c) Relapsing infections—(i) Repeat standard treatment (no maintenance); (ii) chronic B.T. infections—special treatment.

<sup>1</sup> While continued suppression may be no longer necessary to preserve the health of such troops, it must be remembered that suppressive mepacrine will tend to keep the number of gametocyte carriers at a very low level. This may be important when these troops are residing in an area near non-immune troops.

(2) *If the Period of Absence from Heavy Risk of Infection is likely to be of Short Duration.*

(a) Continue suppressive treatment without any cessation.

(b) Attacks treated to produce a rapid clinical cure and this treatment followed by suppression without any interval (i.e. maintenance of treatment).

C. *Individuals Exposed to Constant and Frequent Infections, Reinfections and Superinfections.*(1) *Immune or Salted Populations.*

(a) If much malarial sickness occurs, start moderate dosage of mepacrine suppression (this can often be stopped after a few months).

(b) Attacks treated to produce a rapid clinical cure *not* a radical one.

(c) Gametocyte therapy or light suppressive treatment sometimes necessary to prevent spread of infection to adjacent non-immune troops.

(2) *Non-immune or Semi-immune Troops.*(a) Continuous suppressive mepacrine in full doses, even if there is a break in the malaria transmission season (*vide* B(2)).

(b) Attacks—Short intensive treatment to produce a rapid clinical cure, followed on immediately by continuation of full doses of suppressive treatment.

## REFERENCES.

- AMY, A. C., and BOYD, J. S. K. (1936). *JOURNAL OF THE ROYAL ARMY MEDICAL CORPS*, **67**, 83.  
 DIXON, H. B. F. (1933). *Ibid.*, **60**, 431.  
 Malaria Commission, League of Nations (1937). *Qt. Bull. Health Organ, L. of N.*, **6**, 940-954.  
 MANIFOLD, J. A. (1931). *JOURNAL OF THE ROYAL ARMY MEDICAL CORPS*, **56**, 321.  
 SINTON, J. A., (1930). *Ind Med. Gaz.*, **65**, 603.  
*Idem* (1931). *Ind. Jl. Med. Res.*, **18**, 831.  
*Idem* (1935). *Rec. Mal. Surv., India*, **5**, 516.  
*Idem* (1935a). *Qt. Bull. Health Organ., L. of N.*, **4**, 643.  
*Idem* (1936). *Rec. Mal. Surv., India*, **6**, 91.  
*Idem* (1937). *Sonderabdruck a. d. Festschrift Nocht.*, 573.  
*Idem* (1938). *Riv. Malariol.*, **17**, 305.  
*Idem* (1939). *Jl. Mal. Inst., India*, **2**, 191.  
 SINTON, J. A., and HARBHAGWAN (1935). *Rec. Mal. Surv., India*, **5**, 307.  
 SINTON, J. A., HARBHAGWAN and JASWANT SINGH (1931). *Ind. Jl. Med. Res.*, **18**, 871.  
 SINTON, J. A., HUTTON, E. L., and SHUTE, P. G. (1939). *Ann. Trop. Med. and Parasit.*, **31**, 37.  
 SINTON, J. A., SMITH, S., and POTTINGER, D. (1930). *Ind. Jl. Med. Res.*, **17**, 793.

## ON THE EFFECT OF SULPHAGUANIDINE IN ACUTE BACILLARY DYSENTERY.

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THE rapidity with which sulphaguanidine has become the established remedy in bacillary dysentery perhaps owes more to the inadequacy of previous therapeutic methods than to any convincing proof of its value. The majority of published reports record only results in selected cases (Bulmer and Priest, 1942, 1943; Lyon, 1942; Wilson, 1942; Brewer, 1943; Gard, 1943) or in series too small to permit a reasoned judgment (Paulley, 1942; West, 1943). In larger groups the results have been equivocal. In 100 patients treated with sulphaguanidine, Jamieson, Brodie and Stiven (1944) were able to show an acceleration of recovery only by thirty-six hours over controls treated with aperients and by twenty-four hours over those receiving chalk and opium. The significance of these small differences cannot be determined from their paper. In an outbreak due to *Bact. dysenteriae* Flexner, Roberts and Daniels (1943) found no difference in degree or duration of diarrhoea between controls and those treated with succinylsulphathiazole, a drug others have considered as effective as sulphaguanidine (Smyth, Finkelstein, Gould, Koppa and Leeder, 1943). Thus statistical demonstration of the value of chemotherapy in this disorder is still awaited but the place sulphaguanidine has already gained makes an evaluation of its effect by the "alternate case" method increasingly difficult (Scadding, 1944).

In the hope of providing some indication of its value a comparative analysis has been made of the recovery rates of patients admitted to a military hospital in the Middle East with bacillary dysentery in 1940 and 1943. In the first year treatment was with saline purgatives and in the second with sulphaguanidine. The results of this analysis are reported in the present paper.

## METHODS AND MATERIAL.

In this paper the number of days spent in hospital has been taken as an index of the recovery rate. A more precise estimate would perhaps have been given by bacteriological studies or by the number of days before the motions or sigmoidoscopic appearances became normal. But the time in which a soldier is returned to duty is easily obtained from records and has a practical significance these others lack. No patient was discharged passing abnormal stools. The interval between the return of the motions to normality and leaving hospital was between three and four days. Scrutiny of the figures has shown no variations which could be attributed to such extrinsic factors as changes in the staff or of the number of patients under treatment in the dysentery wards.

It is appreciated that this comparison lacks the value of an "alternate case" experiment and involves the assumptions that the virulence of the infection and the resistance of the individual have remained unchanged. There is no means of showing either of these assumptions to be true or false but the clinical impression has not been of an exalted virulence and individual resistance would tend to rise rather than to fall with residence in an endemic area. The last consideration would weight the figures in favour of chemotherapy. In the following paragraphs an attempt is made to show that the series for the two years are comparable.

The cases considered are those of bacillary dysentery occurring in Other Ranks admitted to this hospital in 1940 and 1943. All patients were treated in the same ward and under similar conditions. There were no deaths during these two years. The acute intestinal infections have been separated into two groups:—

A. *Acute Enteritis*: in which microscopy of the stool shows no inflammatory exudate.

B. *Acute Bacillary Dysentery*: (i) with an "indefinite" exudate in which less than half of the cells are neutrophils (IE); (ii) with a "bacillary" exudate in which more than half of the cells are neutrophils (BE).

In 1940 both groups were treated in similar fashion with saline purgation and restriction of diet. In 1943 patients with bacillary dysentery were treated with sulphaguanidine, the average total dose being between 75 and 140 grammes. Cases of enteritis received no chemotherapy in either year. The number of cases admitted in the two years is set out in Table I.

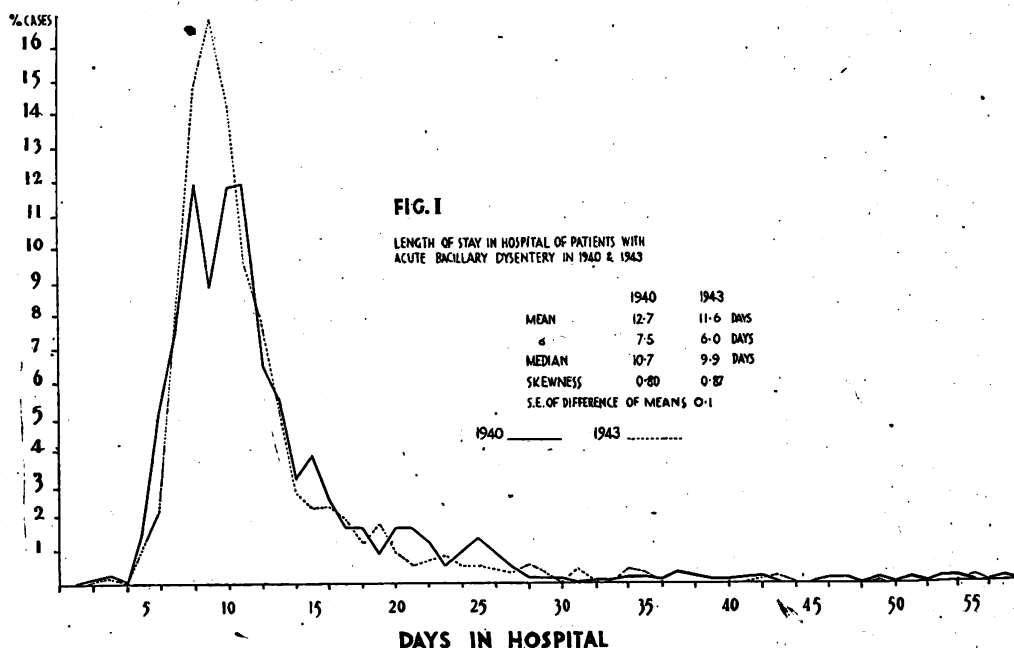
The percentage of total admissions formed by patients with acute intestinal infection in 1943 was considerably lower than that for 1940, but the proportion of patients with diarrhoea to those with dysentery is 1:1.14 in the first and 1:1.79 in the second year. This latter observation could be taken as indicating a higher virulence in 1943 if it be accepted that enteritis is commonly due to a mild dysenteric infection. Nevertheless, the proportions of cases with indefinite and bacillary exudates respectively remain constant for the two years, being in 1940 IE 63 per cent, BE 37 per cent and in 1943 IE 65 per cent, BE 35 per cent. Thus the two series of dysenteric cases are in this respect homogeneous.

In 1940 routine cultures were made and, in about 40 per cent of cases, dysentery bacteria were isolated from the stools. This practice ceased in June, 1943, thus figures are only available for the first five months of this year. The distribution of the various types of organism for these periods is found in Table II. The greater proportion of *Bact. dysenteriae* Sonne infections in 1943 is probably due to the high incidence of this type of dysentery which is commonly seen early in the year in this area. Apart from this discrepancy there is no substantial difference between the two years and it is probable that the two series are homogeneous in respect of bacterial types.

A final indication that the two series are comparable is afforded by a consideration of the length of stay in hospital of patients with enteritis for the two years. These received no chemotherapy in 1943 and were treated in like manner in both years. The details are shown in Table III. The mean length of stay in hospital in 1940 was 8.4 days ( $\sigma$  3.6) and in 1943 8.9 days ( $\sigma$  4.6); the difference of these means is 0.5 day and its standard error 0.23; thus it lies on the verge of statistical significance. The practical importance of twelve hours difference is however so small that it is submitted that the comparison provides evidence, in respect of enteritis, that the virulence of infection for the two years was similar.

#### RECOVERY RATES OF BACILLARY DYSENTERY IN 1940 AND 1943.

Detailed figures for the length of stay in hospital of patients with acute bacillary dysentery are to be found in Table III and fig. 1. Statistical analysis shows the mean time to be 12.7



days ( $\sigma$  7.5) in 1940 when no chemotherapy was employed and 11.6 days ( $\sigma$  6.0) in 1943 when the routine treatment was with sulphaguanidine. This difference of 1.1 days is eleven times the standard error of the difference of the means (0.1) and is thus of statistical significance. Study of the figures gives no further information. It might have been anticipated that sulphaguanidine would have diminished the tendency for the infection to become chronic; however this occurred rarely even in 1940. The measure of "skewness" of the frequency distributions of the two series would give some indication of this tendency and they are 0.80 for 1940 and 0.87 for 1943; this difference is insignificant.

TABLE I.—ADMISSIONS OF ACUTE INTESTINAL INFECTIONS IN 1940 AND 1943.

	1940	1943
Total number of O.R.s admitted to Medical Division :	7,131	14,490
Acute Intestinal Infections :		
Enteritis .. .. .	695	779
Bacillary dysentery .. .. .	808	1,393
(Dysentery IE .. .. .)	509	905
(Dysentery BE .. .. .)	299	488
Total .. .. .	1,503	2,172
Percentage total admissions .. .. .	21.1	15.0

TABLE II.—INCIDENCE OF TYPES OF DYSENTERY BACTERIA ISOLATED IN 1940 AND THE FIRST FIVE MONTHS OF 1943.

	1940	1943 (first five months)
	%	%
<i>Bact. dysenteriae</i> Shiga .. .. .	12	7
<i>Bact. dysenteriae</i> Flexner .. .. .	77	67
<i>Bact. dysenteriae</i> Sonne .. .. .	2	22
<i>Bact. dysenteriae</i> Schmitz .. .. .	7	3
Others .. .. .	2	1

TABLE III.—LENGTH OF STAY IN HOSPITAL OF PATIENTS WITH ACUTE BACILLARY DYSENTERY AND WITH ACUTE ENTERITIS IN 1940 AND 1943.

Number of days in hospital	Dysentery		Enteritis		Number of days in hospital	Dysentery		Enteritis	
	1940	1943	1940	1943		1940	1943	1940	1943
2 ..	1	1	—	1	37 ..	3	—	—	—
3 ..	1	3	5	4	38 ..	2	—	—	—
4 ..	—	—	47	19	39 ..	1	—	—	—
5 ..	12	11	59	81	40 ..	1	—	—	2
6 ..	43	31	119	123	41 ..	—	—	—	—
7 ..	63	122	102	144	42 ..	2	1	—	—
8 ..	100	209	121	114	43 ..	—	2	—	1
9 ..	73	239	73	71	44 ..	—	1	—	—
10 ..	98	205	66	62	45 ..	—	—	—	—
11 ..	99	136	27	40	46 ..	1	2	—	—
12 ..	55	98	18	27	47 ..	1	—	—	—
13 ..	48	69	11	12	48 ..	—	—	—	—
14 ..	26	38	12	16	49 ..	1	1	—	—
15 ..	31	32	5	7	50 ..	—	—	—	—
16 ..	21	33	5	11	51 ..	1	—	—	—
17 ..	14	27	6	8	52 ..	—	—	—	—
18 ..	14	16	2	8	53 ..	1	—	—	—
19 ..	7	24	3	1	54 ..	1	—	—	—
20 ..	14	12	3	3	55 ..	—	1	—	—
21 ..	14	8	1	6	56 ..	—	1	—	—
22 ..	10	15	3	1	57 ..	1	—	—	—
23 ..	4	11	—	2	58 ..	—	—	—	—
24 ..	7	6	—	3	59 ..	1	—	—	—
25 ..	11	6	4	2	62 ..	—	1	—	—
26 ..	7	5	—	1	74 ..	1	—	—	—
27 ..	4	4	1	1	77 ..	—	1	—	—
28 ..	2	8	1	2					
29 ..	2	5	—	—					
30 ..	2	3	—	—	Total ..	808	1,393	695	779
31 ..	—	6	—	3	Mean stay in hospital (days)	12.7	11.6	8.4	8.9
32 ..	1	—	1	1	Standard devia- tion ( $\sigma$ ) (days)	7.5	6.0	3.6	4.6
33 ..	1	—	—	—	Median (days)	10.7	9.9	7.6	7.7
34 ..	2	5	—	1	Skewness (days)	0.80	0.87	0.60	0.82
35 ..	2	4	—	1					
36 ..	1	—	—	—					

## DISCUSSION.

It must be understood that this paper refers only to acute bacillary dysentery as it occurs in the British troops stationed in the Middle East and it is well to recall that all observers have been impressed by the mild character of the infection in recent years. There are no grounds for supposing this mildness to have changed during the years under review. In this type of dysentery and with the reservations made in previous paragraphs the use of chemotherapy has been attended by a decrease of stay in hospital of 1.1 days. It should be noted that with the introduction of sulphaguanidine the use of purgatives ceased and that there is some evidence to suggest that purgation prolongs the period of hospitalization by 0.5 to 1 day (Bulmer, 1942; Jamieson, Brodie and Stiven, 1944). Consequently it is possible that this decrease may be due not to the use of sulphaguanidine but to the discontinuation of purgation. Whatever its cause it is of so small an order as to lack practical importance.

## SUMMARY.

(1) The length of stay in a military hospital in the Middle East of patients with acute bacillary dysentery in 1940 is compared with that for 1943.

(2) In the first year patients were treated by saline purgation; in the second by sulphaguanidine.

(3) The mean length of stay for 1940 was 12.7 days and for 1943 11.6 days; this difference is statistically significant.

(4) It is uncertain how much of this decrease was due to the use of sulphaguanidine and how much to the discontinuance of purgation.

(5) It is stressed that these observations are applicable only to the mild type of bacillary dysentery prevalent in the Middle East.

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## REFERENCES.

- BREWER, A. E. (1943). *Brit. Med. J.*, **1**, 36.  
 BULMER, E. (1942). Communication to Medical Conference, *M.E.F.*, Cairo.  
 BULMER, E., and PRIEST, W. M. (1942). *J. Roy. Army Med. Corps*, **79**, 277.  
*Idem.* (1943). *Lancet*, **2**, 69.  
 GARD, J. J. (1943). *Med. J. Australia*, **2**, 188.  
 JAMIESON, W. M., BRODIE, J., and STIVEN, D. (1944). *Brit. Med. J.*, **1**, 322.  
 LYON, G. (1942). *U.S. Nav. Med. Bull.*, **40**, 601.  
 PAULLEY, J. W. (1942). *Lancet*, **2**, 592.  
 ROBERTS, T. L., and DANIELS, W. B. (1943). *J. Amer. Med. Assoc.*, **122**, 651.  
 SCADDING, J. G. (1944). *Lancet*, **1**, 784.  
 SMYTH, C. J., FINKELSTEIN, M. B., GOULD, S. E., KOPPA, T. M., and LEEDER, F. S. (1943). *J. Amer. Med. Assoc.*, **121**, 1325.  
 WEST, R. F. (1943) *Med. J. Australia*, **1**, 344.  
 WILSON, D. C. (1942). *J. Roy. Nav. Med. Ser.*, **28**, 357.

# ALPHA-AGGLUTININ FOR COLIFORM BACILLI IN DIAGNOSTIC AGGLUTINATING SERA.

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THE report by Stamp and Stone (1944) of the occurrence of an antigen common to several strains of coliform bacilli, which they designate alpha-antigen, and of the finding that agglutinin for these bacilli may be contained in the sera of certain rabbits, has been confirmed by Fairbrother (1944), who demonstrated the agglutinin in a proportion of the diagnostic sera issued by the Emergency Vaccine Laboratory. He suggested that only rabbits whose sera were free of this agglutinin should be used in the production of diagnostic sera.

Strains of some of these non-lactose-fermenting or late-lactose-fermenting bacilli may grow as colourless colonies on desoxycholate-citrate agar (Pulvertaft, 1943), and since this and other selective media may be more heavily inoculated than was the case with the older indicator media like MacConkey's and Litmus Lactose Bile Salt Agar, such strains are now more commonly encountered. Slide agglutination of alpha-containing strains is rapid and striking, and only a low titre of agglutinin is required. For example, a serum prepared against *Bact. dysenteriae* Sonne, which was found to contain alpha-agglutinin to a titre of 1 : 25, gave more rapid and striking slide agglutination of an alpha-paracolon suspension than of the Sonne smooth phase suspension against which it had been prepared and for which the titre was 1 : 125.

In the water-bath in Dreyer tubes it was found that agglutination of alpha-paracolon strains was rapid and intermediate in speed and in size of floccules between H and O agglutinations. Slide agglutination was readily given by sera of which the titre after four hours at 50° C. was 1 : 20, and weakly by sera with a titre of 1 : 10. Titres after four hours at 37° C. were usually slightly lower than those seen after four hours at 50° C., but overnight incubation at 37° C. gave the same results as after four hours at 50° C.

*Alpha-agglutinin in Rabbit Sera.*—Sera from 200 rabbits were examined, covering the years 1937-44. In each case the last available bleed was used, except for a few rabbits from which bleeds were not available, when test bleeds were made. Of these sera, 36 or 18 per cent had a titre of 1 : 20 or over, i.e. they would give ready slide agglutination of an alpha-paracolon culture. The titres of these sera, to which had been added an equal volume of glycerin as a preservative, were as follows. One serum reacted in dilutions up to 1 : 1,280, 2 up to 640, 4 to 320, 4 to 160, 7 to 80, 6 to 40 and a further 12 to 1 : 20. It is apparent that with some sera the titre given by an alpha-containing strain of coliform bacillus might equal or even exceed the titre for the suspension it was intended to agglutinate.

In order to determine whether diagnostic sera could be prepared exclusively in rabbits whose sera were free of alpha-agglutinin, further investigations were carried out. It was found that agglutinin appeared haphazard among the various breeds of rabbit used. Alpha-positive rabbits were distributed fairly evenly throughout the seven-year period studied. The appearance of alpha-agglutinin was not related to the type of inoculum, nor could it be related to periods of ill-health in any rabbit. A long series of sera was available from some rabbits and these were titrated for alpha-agglutinins, commencing at a dilution of 1 : 12½. Some representative results are given.



*Rabbit 16/42. Flexner II (W).*—Bleed No. 1 (4.6.42) = 0, No. 2 = 0, No. 3 =  $12\frac{1}{2}$  trace, No. 7 = 100 trace, No. 8 = 50, No. 10 = 25 trace, No. 11 = 25 trace, No. 13 = 0, No. 14 (22.6.44) = 0.

*Rabbit 36/41. Flexner III (Z).*—Bleed No. 2 (28.11.41) = 25 trace, No. 8 =  $12\frac{1}{2}$  trace, Nos. 9, 10, 12 = 0, No. 15 = 25 trace, No. 16 =  $12\frac{1}{2}$  trace, No. 18 = 100, No. 20 = 200, No. 21 = 400, No. 22 = 200, No. 23 = 200 trace, No. 24 (4.6.43) = 100.

*Rabbit 18/41. Flexner V (P.119).*—Bleed No. 2 (7.8.41) = 0, Nos. 9, 10, 11, 13 = 0, No. 14 =  $12\frac{1}{2}$  trace, No. 18 =  $12\frac{1}{2}$  trace, No. 20 = 0, No. 21 =  $12\frac{1}{2}$  trace, No. 24 (20.6.44) = 0.

The next two rabbits for which results are quoted received injections of the same suspensions on the same days over a period of thirteen months.

*Rabbit 22/43. Para C-O.*—Bleed No. 1 (11.6.43) = 0, No. 2 =  $12\frac{1}{2}$  trace, No. 3 = 0, No. 4 =  $12\frac{1}{2}$  trace, No. 5 (6.7.44) = 50.

*Rabbit 23/43. Para C-O.*—Bleed No. 1 (11.6.43) = 0, No. 2 = 25, No. 3 = 400, No. 4 = 800 trace, No. 5 (6.7.44) = 800.

These results show that preliminary selection of alpha-free rabbits does not guarantee the production of sera free of the agglutinin, and that these agglutinins may appear and disappear at any time during the life of a rabbit. Fortunately it has been found extremely easy to absorb alpha-agglutinins with small doses of a suitable suspension. The dosage of absorbing suspension is comparable to that used in absorbing an unwanted *Salmonella* H factor, and is very much less than the dose required for a somatic factor like *Salmonella* O or Flexner group antibody. For example, a serum having a titre for alpha-suspensions of 1 : 1,280 was completely absorbed by a dose of  $2 \times 10^9$  per c.c. A *Salmonella* H serum with a group titre of 1 : 1,280 required a dose of  $1 \times 10^9$  per c.c., while absorption of the group agglutinin from a Flexner type serum of which the group titre was 1 : 640 required  $2 \times 10^{10}$  per c.c., or ten times that of the alpha-suspension. Even if two or three times the dose of alpha-suspension required for total absorption is added to a serum, the whole suspension undergoes coarse flocculation, and after standing overnight the clear serum can be decanted, leaving only a small deposit which can be centrifuged to recover the remaining serum, or the whole batch may be passed through a clarifying filter.

As a matter of future policy, the selection of rabbits whose sera are free of alpha-agglutinin is regarded as a useless procedure when it is intended to use the same rabbits for serum production over a period of years. The titration and absorption of individual bleeds is too laborious and time-consuming. As each pool of serum is prepared for issue, it will be tested by slide agglutination and in the water-bath from a dilution of 1 : 10 with a suitable suspension. The absorbing dose required for sera found to contain the agglutinin can be roughly calculated from the titre, allowing 50 per cent excess to ensure complete absorption. For the suspension now in use the dose is  $4 \times 10^8$  for each c.c. of serum to be absorbed if the alpha-titre is 100, higher or lower titres requiring proportionate doses. Although this dose is in excess of that actually needed ( $2.5 \times 10^8$ ) the suspension will undergo complete flocculation.

#### SUMMARY.

(1) Agglutinin for alpha-antigen, which is common to several strains of coliform bacilli, is found in the sera of many rabbits, and its presence cannot be related to a particular breed of rabbit, to the inoculum used or to periods of ill-health in the rabbits.

(2) This agglutinin gives rise to striking slide agglutination of paracolon bacilli containing the antigen, even when the titre is low (1 : 20), and in a few cases its titre may be as high as that for the strain against which the serum has been prepared. It may therefore give rise to diagnostic errors. Since these paracolon bacilli are able to grow on some of the selective media, they appear to be more commonly encountered now than when indicator media only were available. These results emphasize that the commonly-used procedure, to which objections can also be raised on other grounds (Francis, 1944) of picking colonies directly from a primary plate for identification by slide agglutinations, not otherwise confirmed, is liable to give fallacious results in the bacteriology of faeces.

(3) The agglutinin may appear at any time during the life of a rabbit and may subsequently disappear. Selection of rabbits free of the agglutinin does not guarantee the subsequent production of alpha-negative sera.

(4) It is desirable that sera prepared for use against alimentary pathogens should be tested for the presence of the agglutinin, which should, if present, be absorbed as a routine. This is to be done with all such sera produced at the Emergency Vaccine Laboratory in future.

We are indebted to Dr. Doris M. Stone for the alpha-strain of *Proteus morgani* 1721 and its alpha-free variant and for samples of alpha-antisera, to Lieutenant-Colonel R. W. Fairbrother, Royal Army Medical Corps, for his strain Paracolon F, and to the Director of Pathology, War Office, for allowing us to see the report from Lieutenant-Colonel Fairbrother and for permission to forward this paper.

#### REFERENCES.

- FAIRBROTHER, R. W. (1944). Report to the Director of Pathology, War Office.  
FRANCIS, A. E. (1944). Army Pathology Laboratory Service, Current Notes, No. 12, 62.  
PULVERTAFT, R. J. V. (1943). *Ibid*, No. 8, 39.  
STAMP, LORD, and STONE, DORIS M. (1944). *J. Hyg. (Camb.)*, **43**, 266.

# THE BACTERIOLOGICAL DIAGNOSIS OF DIPHTHERIA : METHODS EVOLVED FOR THE SPECIAL CONDITIONS OPERATING IN A MILITARY HOSPITAL IN THE MIDDLE EAST.

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ACUTE infection of the upper respiratory tract is one of the common causes of admission to military hospitals in the Middle East. During the winter and spring the common cold and acute streptococcal tonsillitis are prevalent and, in the base areas where the troops have access to the cities, cases of diphtheria are not infrequent. It is the usual practice, therefore, to swab the throat of every patient who, on admission, complains of, or is found to be suffering from, an acute infection of the nose and throat. Thus the laboratory is called upon to bear its usual share of responsibility for correct diagnosis and treatment; and often with fewer facilities than are available under normal conditions. A short account of some of the difficulties encountered and of the methods evolved to overcome these may therefore be of interest. It is based upon the experience gained during a period of two and a half years in two military hospitals in Egypt.

## METHODS EMPLOYED.

The throat swab itself deserves more attention than is usually paid to it. A singed swab, the result of sterilization at too high a temperature, should be discarded because singed wool is non-absorbent and friable. Discoloration of the wool by rust derived from the metal holder is another not infrequent fault. Swabs stained in this manner should not be used because soluble salts of iron may thus be transferred to the medium in a concentration sufficient to inhibit the growth of iron-sensitive organisms. Swab holders made of wood are preferable to metal ones.

The importance of careful swabbing cannot be over-emphasized. This should be carried out by the M.O. himself and not be left to subordinates. A good view of the throat must be obtained so that the swab can be thoroughly rubbed over the areas most affected. When the electric torch fails—a not infrequent event—it is usually possible during daylight hours to borrow a small mirror from one of the patients and with this to reflect into the mouth the light from a nearby window. In a dark tented ward it may be necessary to use a second mirror held by an attendant in such a position as to bring a ray of sunlight to the vicinity of the observer who in turn reflects this into the patient's mouth. This method gives extremely good results. When the swab has been taken it should be sent without delay to the laboratory for immediate culture. In a warm dry climate the exudate on the swab rapidly dries and this results in a decided fall in the number of viable organisms. The practice of allowing the throat swabs to wait for plating until the end of the day's work should be strongly condemned.

*Media.*—Loeffler's inspissated serum is not a satisfactory medium for routine diagnosis. Some strains of *C. diphtheriae* when grown upon this medium fail to show a typical morphology while some *gravis* types completely fail to grow on it. These statements, which are founded upon our own experience, are in agreement with the work of other investigators (Parish, 1934, 1936; Goldsworthy and Wilson, 1942). Some improvement in results was obtained by using a tryptic digest heart medium in place of a plain meat broth but occasional failures to isolate

the causal organism from clinically typical cases of diphtheria were still encountered. Up to this time slopes of Loeffler medium in small (2-drachm) screwed-capped bottles had been used. This method has the serious disadvantage of preventing a careful examination of colonial appearance owing to the thickness and poor quality of the glass used in the manufacture of these bottles. Furthermore, these small screw-capped bottles do not provide the abundance of oxygen required by *C. diphtheriae* for optimal growth. For these reasons it was ultimately decided to discontinue the use of slopes of inspissated serum medium in favour of plate cultures, one 3½ inch Petri-dish serving for the inoculation of 6 or 8 swabs. Two media were used, a tryptic digest beef-heart agar containing 0.5 per cent of glucose and 3.0 per cent of human whole blood (out-of-date citrated blood obtained from the transfusion centre); and the tellurite medium of Hoyle (1941); this again being prepared with human blood. On the blood agar all three types of *C. diphtheriae* grow well and retain their characteristic morphology. Only one difficulty was encountered: the human red cells when added to the digest agar sometimes agglutinate into small clumps thereby imparting to the medium a finely granular appearance instead of the uniform red colour obtained by using blood from the horse, sheep or rabbit. The use of old stored blood was not the responsible factor because the same effect was observed when fresh blood was employed. On the tellurite medium the colonial appearances of the three types of *C. diphtheriae* were not well differentiated but this did not detract seriously from its value. The use of old potassium tellurite and the incorporation of human blood instead of rabbit blood were probably responsible for this poor differentiation. Human blood was used for reasons of expediency rather than choice. Supplies could readily be obtained from the hospital blood bank whereas fresh animal blood was usually unobtainable. In spite of this disadvantage, however, the tellurite medium proved of considerable value on account of its ability to indicate the presence of a few colonies of *C. diphtheriae* in a heavily mixed growth. Preliminary isolation was followed by fermentation tests, examination for hæmolytic activity and, when necessary, by virulence tests. For the differentiation of the three types of *C. diphtheriae* reliance was mainly placed upon starch fermentation, the type of growth in tryptic digest broth and tests for hæmolysin production. For the latter the blood agar plate is not reliable; a more satisfactory method is to add 0.5 c.c. of a 5 per cent suspension of washed human red cells to a broth culture, the mixture being then placed in the incubator for thirty minutes before it is examined.

**Direct Films.**—The throat swabs having served their main purpose as inocula were then used for the preparation of direct films. Usually sufficient organisms remain adherent to the wool to allow this to be done. Two films were prepared from each swab, one of these being stained by Neisser's method and the other by the Gram stain. Direct films are less often used now than they were in the early days of bacteriology; but when, as in our own case, it is possible to prepare the films within a short time of the taking of the swab the extra labour involved is certainly justified. The value of the direct film is not confined to its ability occasionally to reveal *C. diphtheriae*; an early report of the presence of large numbers of streptococci or the organisms of Vincent's angina is often helpful to the clinician.

**Choice of Stain.**—In our experience none of the newer differential stains gives such clear results as those obtained by Neisser's method. One small but important modification of the usual procedure is recommended; instead of flushing off the stain with tap water it is drained off and the slide is blotted between folds of clean filter paper. The separate solutions Nos. 1 and 2 need not be mixed freshly for each slide; a mixture of the two remains stable for at least a week. Provided that these technical methods are carried out from start to finish by experienced workers it is permissible to prepare ten films from different swabs or cultures on one microscope slide, the latter having been ruled into 10 separate areas by grease pencil lines. This considerably shortens the time required both for staining and examination. In order to achieve the best results the closest liaison between the ward and the laboratory should be maintained. A good bacteriological technique is by itself insufficient to avoid the occasional tragedy resulting from a missed or delayed diagnosis. The ideal arrangement is for the clinician at the end of his ward round to visit the laboratory and compare notes

with his bacteriological colleague. It can then be decided which cases require further investigation; and the bacteriologist may with advantage himself visit the patient to obtain further swabs. It was by adopting a plan such as this that the collection of the following data was made possible.

#### RESULTS OBTAINED.

At the laboratory where this investigation was carried out 7,686 throat swabs were examined during a period of twelve months. Of this total, which included clearance tests, 703 (7·8 per cent) yielded cultures of *C. diphtheria*. These figures will serve to indicate the importance of the throat swab in military medicine. The following analysis, however, refers to a shorter period (October to February) coinciding with the season of highest incidence of diphtheria in Egypt. During this period 280 patients were admitted to the diphtheria wards of the hospital. Of this number 224 (80 per cent) had been diagnosed on clinical grounds as cases of faucial diphtheria and the bacteriological examination confirmed this diagnosis. In 25 cases (9 per cent) the presence of *C. diphtheria* was reported by the laboratory but the clinical condition on admission and the subsequent progress disagreed with this finding. These patients were given antitoxin and discharged as soon as the throat appeared normal and necessary clearance tests had been completed. In the remaining 31 cases (11 per cent of the series) *C. diphtheria* was not found although the clinical diagnosis of faucial diphtheria was certainly correct. Some of these failures were probably due to the fact that antitoxin had already been given prior to admission; but even if these late-admissions are excluded there still remain a number of cases, some of them severe and one of them fatal, in which the causal organism could not be demonstrated. There were seven deaths in the whole series; five due to myocardial degeneration, one to extensive neural degeneration and one hypertoxic case in which death occurred forty-eight hours after the onset of symptoms in spite of early and energetic treatment. A *gravis* strain was isolated in six of these fatal cases; repeated examinations failed to demonstrate the organism in the remaining case. Histological examination left no doubt about the cause of death. With the exception of the one case of post-diphtheritic neural degeneration the patients all died of cardiac failure, the microscope revealing extensive degeneration of the myocardium. Even when death occurred very early (forty-eight to seventy-two hours) irreparable damage to the cardiac muscle had already taken place.

*Typing of Strains*.—A series of 259 strains of *C. diphtheria* were typed according to their cultural and biochemical reactions. The criteria used for differentiation were the fermentation of starch, hæmolysin production, pH reversal of medium and type of growth in glucose broth. On this basis of differentiation, 91 per cent proved to be *mitis* strains, 8 per cent *gravis* and one per cent *intermedius*. Of the 21 *gravis* strains, 3 were found to be avirulent; these had been isolated from patients with acute tonsillitis diagnosed on clinical grounds as non-diphtheritic. Some of the *mitis* strains were isolated from cases of severe toxic diphtheria.

*Cutaneous Diphtheria*.—The old belief that "desert sores" are due to infection of the skin with *C. diphtheria* has been superseded by the teaching that these common and troublesome lesions are due to streptococcal infection, the condition being classified as an ecthyma. Most bacteriologists with experience in the Middle East will agree that not more than 10 per cent of these sores yield cultures of *C. diphtheria*. However, the fact that this organism does occasionally occur in wounds and desert sores must not be forgotten. The writer has seen two fatal cases of diphtheritic paralysis due to secondary infection of battle wounds. The investigation of a small collection of 87 strains of *C. diphtheria* isolated from wounds or desert sores gave the following results:—

<i>Gravis</i> strains	4;	virulent	3	avirulent	1
<i>Mitis</i> strains	82;	"	54*	"	11
<i>Intermedius</i> strains	1;	"	0	"	1

\*17 strains were not tested for virulence.

Several instances were encountered of secondary infection with *C. diphtheriæ* occurring at the same time among patients in the surgical wards. These came to light as the result of bacteriological examinations undertaken because the surgeons had noticed an alteration in the appearance of the wounds. The usual method of treatment was to give 16,000 units of diphtheria antitoxin without waiting for the result of a virulence test. On account of the risk of diphtheritic paralysis this form of treatment is certainly justified. In one small outbreak of this kind a carrier was discovered among the ward staff.

#### DISCUSSION.

The results of this present investigation obviously leave room for improvement; yet they represent the best that could be obtained by careful attention to every detail of technique and by close collaboration with the clinical staff. Added to this were the advantages of a military organization which ensures immediate examination of all who report sick and early hospitalization. Equal facilities are seldom available on a large scale in civil life. So far as the laboratory is concerned it appears that nothing short of the standard of efficiency here achieved should be accepted.

The unsatisfactory results obtained with Loeffler's medium were not unexpected; they conform with the evidence accumulated by a large number of investigators including Claiberg (1931), Bender and Bruns (1936) Cooper and his associates (1940), Goldsworthy and Wilson (1942) and Cruickshank (1943). A recent report by Knox (1944) based on the experience of seven different laboratories of the E.M.S. Public Health Laboratory Service provides further proof of the danger of relying upon Loeffler's medium. From all these investigations the fact emerges that even when this medium is very carefully prepared it fails to reveal the organism in 20 per cent of positive throat swabs. The work of Goldsworthy and Wilson shows that many laboratories rely upon a Loeffler medium which falls very far short of even this standard.

It will be noted that the methods adopted are in most respects similar to those advocated by other workers. The one important departure from established procedure is the use of a blood-agar medium in place of inspissated serum. The blood-agar plate saves both time and material and it brings out clearly the morphological and cultural appearances which are typical of *C. diphtheriæ*. When the method was first employed it was expected that on such a rich pabulum the corynebacterium would be overgrown by other organisms. Experience has proved, however, that this does not often occur. Another anticipated difficulty was overgrowth of the whole plate by aerobic spore-forming organisms of *Proteus*; but these were seldom encountered. The plates must, of course, be "dried off" in the incubator before they are used and a good depth of medium must be allowed.

In summary, the fairly extensive trial given to the methods here described appears to justify the belief that blood-agar used in conjunction with some form of tellurite medium offers the best chances for the recognition of *C. diphtheriæ*.

#### SUMMARY.

(1) In the diagnosis of diphtheria the laboratory should be able to give timely and reliable help to the clinician. This can only be achieved by employing modern methods of cultivation, by attending to every detail of technique and by collaborating closely with the clinical staff.

(2) There is overwhelming evidence that Loeffler's medium is unsatisfactory, particularly in the case of *gravis* infections where the necessity of an early diagnosis is greatest. No laboratory which undertakes the bacteriological diagnosis of diphtheria should presume to issue a report based solely on the examination of a Loeffler culture.

(3) The methods described in this paper were evolved to meet special conditions. They gave reasonably satisfactory results but it is not suggested that they should be adopted in detail. The principle of using blood-agar plates is, however, strongly recommended. This method used in conjunction with some form of tellurite medium provides the best chance of successful isolation of *C. diphtheriæ*.

## ACKNOWLEDGMENTS.

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I have finally to thank Major-General L. T. Poole, *D.S.O.*, *M.C.*, *K.H.S.*, for authority to forward this paper.

## REFERENCES.

- BENDER, E., and BRUNS, H. (1936). *Deutsch. med. Woch.*, **62**, 893.  
 CLAUBERG, K. (1931). *Zenibl. Bakt.*, **120**, 324.  
 COOPER, K. E., HAPFOLD, F. C., JOHNSTONE, K. I., McLEOD, J. W., WOODCOCK, H. E., and ZINNEMANN, K. S., (1940). *Lancet*, **1**, 865.  
 CRUICKSHANK, J. (1943). *Public Health*, **57**, 17.  
 GOLDSWORTHY, N. E., and WILSON, H. (1942). *J. Path. and Bact.*, **54**, 183.  
 HOYLE, L. (1941). *Lancet*, **1**, 175.  
 KNOX, R. (1944). *Monthly Bull. Ministry of Health and E.M.S.P.H.L.S.*, **3**, 34.  
 PARISH, H. J. (1934). *Lancet*, **2**, 1192.  
 Idem (1936). *Proc. Roy. Soc. Med.*, **29**, 481.

# THE TREATMENT OF DYSENTERY IN A FORWARD HOSPITAL.

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THE following review is intended neither as original nor as authoritative. It is merely an account of the experiences gained and lessons learned as an Officer in Medical Charge of the Dysentery Section of a forward I.G.H.(C) for the period of eight months, May to December, 1943. Cholera and helminthic disorders are not discussed.

(1) A total of 2,114 patients were investigated, all of whom were I.O.R.s. Table I shows the relative incidence of amœbic and bacillary dysentery, the frequency of the former being approximately twice that of the latter. The *Bacillary Group* includes those who had a bacillary exudate with negative culture and the *Diarrhœa Group* those who were reported to have an "indefinite exudate" with negative cultures and absent *Entamœba histolytica*.

TABLE I.

	Protozoal 701	Bacillary 370	Diarrhœa 975	Amœbic Hepatitis 68	Total 2114
Number of Cases					

TABLE II.

(Monthly Incidence.)

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Diarrhœa	191	174	124	98	121	81	80	106
Dysentery (Protozoal)	86	110	129	83	58	64	67	104
Dysentery (Bacillary)	64	82	75	41	25	20	34	29

(2) Patients were drawn from a highly endemic malarious area and a proportion of admissions were complicated by a coexisting malaria cachexia, a vitamin deficiency (more especially B<sub>1</sub>) or active clinical malaria. Cases were normally received on the 2nd to the 4th day of the disease and were usually untreated. Ls. of C. were not easy.

(3) All patients (apart from those needing urgent treatment) were first sent to the Dysentery Admission Ward, where they remained until diagnosed. They were then segregated in three wards—one for amœbic, one for bacillary and one for miscellaneous dysenteries. The remainder, internal or external hæmorrhoids, malaria, chronic malaria cachexia, parasprue, etc., were transferred to the other sections of the hospital for appropriate treatment. The simple diarrhœas and cases with no appreciable disease were discharged. No hospital kit was issued to patients in the Admission Ward—a very great economy in linen, especially during the monsoon. The main advantage of the Admission Ward was that it saved beds for true dysenteries and stopped cross infection. When large numbers of undiagnosed cases of diarrhœa are being received, an Admission Ward is held to be of very great value.

The dysentery block itself was sited next to the clinical side room—an obvious situation—as the number of *Entamœba histolytica* seen is directly dependent on the delay that occurs before the stool is examined. The value of a warm bed-pan (Manson-Bahr, 1942) especially in cold weather is emphasized and helps to increase positive microscopical findings.

Much difficulty was experienced in obtaining accurate histories. A history of more than three to four months was seldom elucidated and even this was scanty and inaccurate. It is therefore suggested that a page or so of the I.O.R.'s Pay Book be set aside for hospital diagnoses. The dates of admission and discharge and the diagnosis would probably suffice, the hospital or medical unit discharging the patient to duty or to a convalescent depot entering the date of discharge. This method would not cause much inconvenience and would add materially to one's knowledge of the patient's previous history.



(4) All cases had routine blood slides and a minimum of four daily stool examinations following an initial dose of saline or castor oil. Unfortunately the hospital was without a sigmoidoscope for most of the period under review. Its value in the differential diagnosis of amœbic and bacillary dysentery has been fully substantiated. No special dietary scale could be laid down and after the first day all patients were encouraged to eat a full diet. The under-nourished and cachectic were given a special malnutrition diet of up to 5,000 calories. No ill-effects have been noted following this practice. All patients were encouraged to drink 8 pints of fluid per day and each had one pint of water at his bedside. A four-gallon container was also kept in each ward and a convalescent patient was detailed to act as water carrier. Water discipline was especially inculcated in those taking sulphonamide drugs. Intravenous fluids were given in about 50 cases, mostly for acute amœbic dysentery, and to a far less extent for the bacillary type. In the anæmic it has been found wise to give a pint of whole blood or a pint or two of plasma followed by 4 pints of glucose-saline. A repeat transfusion (plasma or saline) within thirty-six hours has given enhanced results. A total of 8 pints in this period has usually been sufficient. The value of thoroughly washing through the giving set before starting the infusion is emphasized, as fungus growth in the tubing is common in humid weather and can cause severe reactions.

(5) *Bacillary Dysentery*.—370 cases ; 7 deaths.

TABLE III.

	<i>Shiga</i>	<i>Flexner</i>	<i>Sonne</i>	<i>Schmitz</i>	<i>Boyd</i>	<i>Bac. Ex.</i>	<i>Total</i>
Number of Cases .....	61	137	23	40	8	101	370

Generally these cases were of a mild nature, unless complicated by intercurrent disease. Some had coincident amœbic dysentery.

The specific treatment used for sulphapyridine was—2 grammes initially and 1 gramme four-hourly for the first twenty-four hours and 1 gramme t.d.s. on the succeeding two days. Sulphaguanidine was not available. This dosage (11 grammes) was adequate for all cases except one, and he failed to respond to full doses of either sulphapyridine or sulphaguanidine. It has been pointed out (Brewer, 1943) that sulphaguanidine should be continued for two to three days after the stools are normal to avoid a relapse. This observation was not confirmed with sulphapyridine, and no case of relapse was noted. When intravenous fluids were found necessary soluble M & B was given.

*Adjuvant treatment* consisted of mist. pot. cit. 1 oz. q.q.h. (Napier, 1943) and fluids orally (8 to 10 pints per day was the aim). All cases with severe diarrhoea were given mist. 3/15 one oz. at night. Polyvalent serum was used in all Shiga infections, but its efficacy was not proved.

*Points in Sulphapyridine Therapy*.—(i) The I.O.R. tolerates the drug poorly. Although I have no statistical proof, I have the impression that he tolerates this drug much better in diseases other than dysentery—more especially pneumonia.

(ii) The drug controls diarrhoea so quickly that a coincident amœbic infection is often overlooked. It is for this reason that sulphapyridine is now only given in the severe cases.

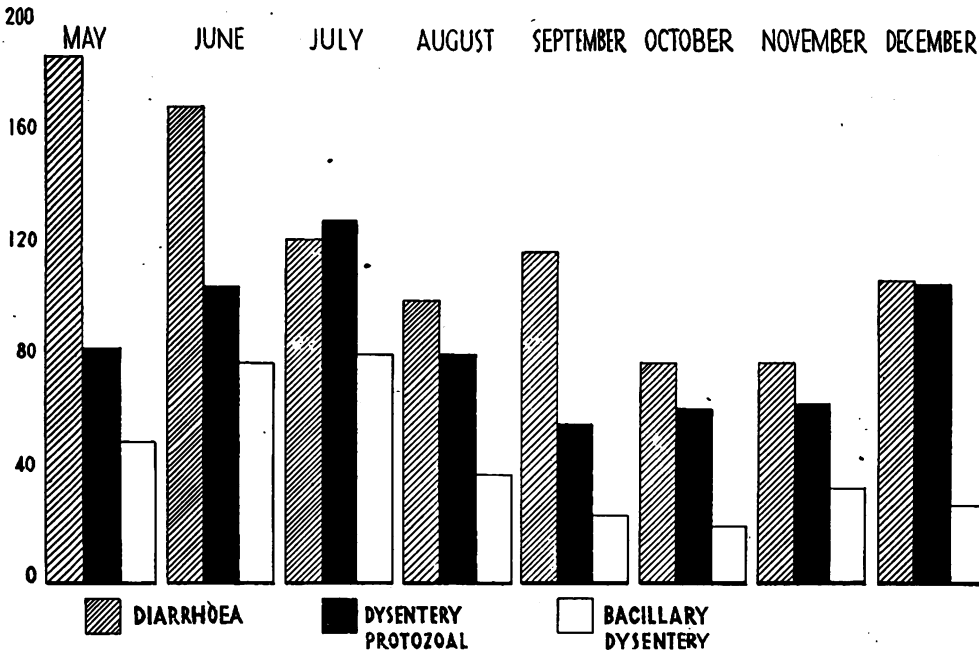
(iii) *Anuria*: Much has been written of late on this complication (Burt-White and Johnson, 1943 and Cuncliffe, 1943) and here one can confirm that the danger is a real one and must constantly be borne in mind. The average I.O.R. is notoriously loath to take sufficient fluids, and so renders himself very liable to crystal formation. Language difficulties (in the absence of specific questioning or routine urine examinations) may lead to a tardy recognition of this condition. Although no case of anuria occurred in the wards, several such were received as transfers, all necessitating cystoscopy, and in one nephrostomy. Nine cases of hæmaturia or dysuria and one case of renal colic with hæmaturia occurred in the wards but responded to the routine early treatment. Briefly this was: (a) Stop sulphapyridine; (b) increased fluids and alkali; (c) hyoscine hyd. grs. 1/200 and atropine sulph. grs. 1/100 (hyoscine preferred to morphia as the latter temporarily inhibits the secretion of urine (Minnett, 1942); (d) saline infusion and/or external ureteric massage; and (e) cysto-

scopy. In the early hæmaturia the first two or three treatments sufficed. Flynn (1943) has fully described the treatment of sulphapyridine anuria and his procedure should be of especial help in units without a cystoscope.

(iv) The same care as is used in administering anti-malarial drugs was found necessary in giving sulphapyridine, and all tablets were given either by a sister or a M.O. The complications that arise if this care is not taken need not be enumerated.

*Results of Sulphapyridine Therapy.*—Compared with the saline treatment sulphapyridine reduced the average duration of stay in hospital from fourteen to eleven days. These figures compare unfavourably with those received from the Middle East (Paulley, 1942; Bulmer, 1943; Brewer, 1943) but are probably explained by: (i) the higher incidence of concomitant disease; (ii) the relatively poorer physique; and (iii) the delay in treatment (twenty-four—ninety-six hours) which was the lot of this series.

*Cause of Death.*—7 cases. 1·8 per cent: This was usually the effect of an intense toxæmia on a debilitated subject. Three cases had a coexistent bronchopneumonia.



(6) *Amœbic Dysentery.*—701 cases; 10 deaths.

Owing to shortage of beds all amœbic dysenteries who were fit to travel and whose diarrhoea was controlled were evacuated down the line after the sixth injection of emetine. Our main interest was therefore one of diagnosis. The acute amœbic dysentery was severe, often simulating an acute Shiga infection, but diagnosis was not difficult, the vegetative forms of *E. histolytica* being easily found. Difficulty arose when there was a double infection. Amœbic dysentery, like malaria, can simulate many diseases. The following are some of the preliminary diagnoses made and indicate the various forms it can take: sprue, malaria cachexia, chronic intestinal obstruction, constipation, appendicitis (acute and chronic), perinephric abscess and intestinal tuberculosis. The latter is common in I.O.R.s (Napier, 1943) and may coexist with amœbic infection. *E. histolytica* can cause an acute appendicitis necessitating operation. The most constant symptoms were a decline in physical well-being (usually gradual) and an intermittent diarrhoea. The latter history may only be obtained in response to direct questioning. No very constant signs were noted on physical examination, but in those with poor abdominal musculature a thickened cæcum or descending colon was often felt. The white cell count is often raised, sometimes as high as 20,000 per c.mm., with a relative increase in granulocytes. An eosinophil count was not an aid to diagnosis.

Most cases responded well to emetine, daily injections of 1 gramme with a three days' rest preceding the second course of three injections. Patients were normally evacuated on the seventh day of treatment. Sulphapyridine was also given to those with severe and uncontrolled diarrhoea and proved a very valuable adjuvant.

*Cause of Death.*—10 cases ; 1.4 per cent.

Of these 10 cases 4 perforated, one had gangrene of a section of the descending colon and the rest had extensive ulceration.

(7) *Amœbic Hepatitis and Amœbic Abscess.*—68 cases.

There is little fresh that can usefully be said of amœbic hepatitis or amœbic abscess, except to confirm the value of therapeutic emetine. A right pleural effusion or signs of consolidation in the right lower lobe were common presenting symptoms in this series.

#### HYGIENE.

The dry-pan type of latrine was used and the container or bedpan emptied into a large receptacle. The bedpan was then washed with cresol and re-washed with water. Fluid refuse was deposited in an Otway Pit and the solid refuse burnt in an ASH incinerator. This drill was rigidly enforced but had to be checked frequently. The need for intelligent sweepers who will not be transferred to other sections is obvious.

I cannot conclude a review of the dysenteries without a word of praise for the ASH incinerator. It is as big an advance in the prophylaxis of bowel disorders as sulphapyridine is in the treatment of bacillary dysentery.

#### SUMMARY.

The administration of a dysentery ward in a forward Field Hospital and the investigation and treatment of 2,114 cases of diarrhoea and dysentery are discussed. Amœbic dysentery was found to be twice as frequent as bacillary in this area.

I am much indebted to Lieutenant-Colonel R. N. Tattersall, R.A.M.C., for his helpful advice and criticism during the period under review, and to Captain T. E. Parry, R.A.M.C., for the excellent co-operation between ward and laboratory.

#### REFERENCES.

- BREWER (1943). *B.M.J.*, January 9, p. 36.  
 CUNNIFFE (1943). *Ibid.*, July 3, p. 11.  
 BURT-WHITE, and JOHNSTONE (1943). *Ibid.*, October 23, p. 508.  
 MINNETT, "Handbook of Anæsthetics," p. 291.  
 FLYNN (1943). *Lancet*, May 22, p. 648.  
 PAULLEY (1942). *Ibid.*, November 21, p. 592.  
 BULMER (1943). *B.M.J.*, August 7, p. 374.  
 NAPIER (1943). "The Principles of Tropical Medicine."  
 MANSON-BAHR (1942). "Manson's Tropical Diseases."

# EXPERIENCES OF WAR SURGERY AT A 600 - BEDDED GENERAL HOSPITAL IN PALESTINE, NOVEMBER 1940 TO AUGUST 1941.<sup>1</sup>

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[Received November 24, 1944.]

The period during which this hospital was receiving casualties can be divided into two phases :—

- (1) From November, 1940, to April, 1941, when we were receiving casualties from the first Western Desert Campaign—four months ; and
- (2) The period June to July, 1941 (two months), when we were receiving wounded from Syria.

Some of the earlier casualties from the Western Desert had already passed through other hospitals, but in March and April, 1941, many of the wounded had only had treatment at C.C.S.s, and several had come direct from Tobruk to Haifa on hospital ship and thence to our hospital by train.

In the case of the Syrian war, casualties passed through the C.C.S. at Nazareth or the Advanced Dressing Station at Damascus, travelled by Hedjaz railway to Amaan and from there by ambulance convoy to Jerusalem.

Most of the cases admitted to our hospital were " late " cases, i.e. a period of over twelve hours had elapsed between the infliction of the wounds and admission of the man to hospital, in many cases four to five days. Some of the cases had passed through a C.C.S. or advanced operating centre where the wounds had already been surgically treated, and in this connexion we met with the following faults in technique :—

(1) Primary suture : After excision of the wound, primary suture had been carried out and invariably the sutures had to be removed and drainage of the wound instituted on account of sepsis.

(2) Amputation stumps had been tightly sutured and on admission the sutures had to be removed, but often necrosis from tension on the skin had already occurred.

These two faults were most commonly encountered in the Free French wounded, whose surgeons seemed to amputate more frequently than we did.

(3) The third fault, one to which others have drawn attention, was the application of encircling plaster of Paris bandages, especially for G.S.W.s of leg with fracture and of the upper arm with fracture of humerus. It was our experience that where plasters had been applied and the patient immediately, or within twenty-four hours, sent on, these plasters had to be removed almost at once on account of the pain, swelling and pressure they were producing. In this connexion, if the wounded man cannot be kept for forty-eight hours before transport, I think a long postero-lateral plaster slab would be preferable for G.S.W. leg. With regard to the abduction plaster for G.S.W. humerus we found that not only was the comfort of the patient improved, but the position of the fragments also, when the plaster was removed and a " collar and cuff " with a long lateral plaster slab applied.

## TREATMENT OF THE WOUND IN HOSPITAL.

As most of the cases we dealt with were " late " cases, the complete excision technique, which ideally produces as nearly an aseptic wound as possible, could not be carried out on account of this time factor.

The procedure we evolved was one of *modified excision*, producing free drainage to the surface, and *immobilization in plaster of Paris*.

<sup>1</sup> Owing to pressure on space some cuts have been made in this article. The necessity to do this is regretted.—Ed.

\* For a wound due to a high velocity missile with entrance and exit wounds it was found unnecessary to lay the whole track open widely. By enlarging the entrance and exit wounds by means of radiating incisions in skin and fascia, and light packing with sterilized vaseline gauze, drainage could be properly instituted. Powdered sulphonamide might be applied, if available, and the part immobilized in plaster of Paris—in the case of the limb, fixing the joints above and below the lesion.

For the treatment of low velocity missile wounds over twenty-four hours late—here again complete excision was not considered practicable and a modified excision was adopted, the principle being to leave the wound adequately drained to the surface.

The skin of the surrounding area was shaved and aseptic technique employed. The skin edges were excised and the wound laid open by radiating incisions, allowing a thorough exploration of the wound.

*The Fascia.*—Often there was found only a small hole in the fascia, but on incising it extensive laceration of the underlying muscle was discovered. Radiating incisions of the fascia were made.

No extensive excision of muscle was made unless it was obviously necrotic.

*Bone.*—Only completely loose fragments were removed.

*Nerves and vessels* were not repaired and only if a large vessel were torn and was bleeding was it tied.

*Foreign Bodies.*—All cases having been X-rayed before operation, we applied the rule that F.B.s were removed only if readily accessible. The large fragments practically always carried some cloth with them, and often there was a collection of sero-pus around them and sometimes a collection of gas visible also in X-ray. Large splinters were removed, but smaller ones were left and, in a few cases, later, localized abscess formation round the F.B. required incision.

General anæsthesia was employed in all these cases as with local it would have been impossible to explore the wounds completely.

After the modified excision technique described above, the wound was treated with sulphonamide powder, light packing with sterilized vaseline gauze carried out and plaster of Paris applied.

It was our experience that with the proper institution of drainage and immobilization in plaster of Paris the patients were comfortable, their temperatures, which on admission were often elevated, fell, and in some cases the dressing could be left alone for six weeks, at the end of which time removal of the dressing showed an apparently healthy, granulating wound with advancing union of fractures (if these were present).

In other cases at the end of fourteen days the plaster was removed, a culture from the wound done, and secondary suture carried out.

Elevation of the temperature without pain and with no rise of pulse-rate does not call for the removal of the plaster. A white cell count is done and if a leucocytosis is present a course of sulphonamide is given and the condition settles down, so long as there is free drainage from the wound.

With the closed plaster treatment, if drainage is incomplete, then pain, elevation of pulse-rate and temperature occur and, on removing the plaster, examination of the wound usually reveals undrained collections of pus which are dealt with and the plaster re-applied.

It was our experience that it was very seldom necessary to remove a plaster case. We also found that changing of a plaster and dressing the wound was usually followed by a rise of temperature lasting three or four days.

The question of the smell which develops is one that has not been satisfactorily answered but we were trying, with perhaps as much success as any other measure, the effects of gauze bags filled with coffee grounds bandaged on to the stained part of the plaster.

There is no doubt that the closed plaster treatment, combined with the prophylactic use of sulphonamide, controls the local infection, provided adequate drainage to the surface has been allowed. Healthy looking granulation tissue is rapidly promoted but the growth of

epithelium appeared to be delayed and often, though the fracture had united, the skin lesion was still granulating and the epithelium surrounding it was thin, blue and unhealthy.

In some cases skin grafts were done, in others we were trying the effect of dressing the wounds with a 15 per cent solution of fresh chicken heart in Ringer's solution. This method was tried out in co-operation with the staff of the Hadassah Hospital, Jerusalem, and seemed to have a very definite effect in hastening epithelialization.

*Chemotherapy.*—A standard dosage of sulphonamide (and of M & B 693 in the case of chest wounds) was employed as routine. Whether the men had been on doses of sulphonamide prior to admission could be culled from their A.F. W. 3118, but all cases were given a post-operative course and no toxic effects were noted.

**WOUNDS OF BUTTOCK.**—There were 28 of these, 18 due to G.S.W. and 10 to splinters.

Of these, six men had through and through wounds of the buttock which received no other local treatment than a flavine dressing. They healed quite well and their average stay in hospital was nineteen days. One of these cases was transferred to an Australian General Hospital on the twelfth day, but the others were sent to the Convalescent Depot where they were under canvas and had to "do" for themselves.

In 8 cases the wounds had been excised and packed in a C.C.S. In 2 cases excision and primary suture had been done before admission. Needless to say these 2 cases were grossly infected on admission, and their stay in hospital was over sixty days apiece, F.B.s having to be removed later from both. In the 8 cases where excision and packing had been done prior to admission, F.B.s were removed in 4 and left alone in 2, and their average stay in hospital was fifty-three days.

In the 9 cases which we had to deal with primarily, a modified excision and treatment with M & B 693 powder locally, followed by drainage with sterile vaseline gauze and closed dressing, was the routine. Their average stay in hospital was thirty-seven days.

Of the 28 cases, 18 were sent to the Convalescent Depot after a stay in hospital of an average of forty-four days, 6 were transferred to an Australian or Indian General Hospital after an average stay of sixty days, 2 were sent to the Prisoner of War Camp, and 2 were boarded to the United Kingdom.

#### COMPLICATIONS OF BUTTOCK WOUNDS.

(1) (i) *Infection* occurred in 12 cases and could, I think, have been avoided by better drainage on excision. This figure includes the 2 cases primarily sutured at a C.C.S. Two cases had exit wounds so close to the anus that infection was hardly avoidable.

(ii) *Bone Injury.*—Only 2 cases of buttock wounds were complicated by bone injury—(a) a comminuted fracture of ilium with entrance wound in buttock and exit in right iliac fossa, (b) a comminuted fracture of ischium.

(iii) *Nerve Injury.*—One case had a complete sciatic nerve paralysis. He had a huge grossly infected wound and was transferred to the orthopædic centre after a period of 110 days.

In another case the sciatic nerve was exposed in the wound but not damaged. He had a temporary paralysis which cleared up and he was discharged to the Convalescent Depot on the seventy-fourth day.

Two cases had temporary paresis of the leg with drop foot and accompanied by severe hyperæsthesia along the distribution of the common peroneal nerve. Both recovered completely.

(iv) *Vessel Injury.*—One case had a severe secondary hæmorrhage from the gluteal vessels which required transfusion and packing.

(2) **WOUNDS OF THIGH** totalled 69—27 due to splinters and 42 to G.S.W.

Of these, 8 had through-and-through wounds with varying degrees of muscular destruction; in 2 cases no surgical treatment had been carried out prior to admission to the General Hospital. In both these cases, which were admitted 16 days and 7 days respectively after the infliction of the wounds, gradually increasing swelling of the thigh made its appearance, and in both a large hæmatoma surrounding a wound in the femoral artery was discovered; ligation had to

be carried out. The other through-and-through wounds had been treated at a C.C.S. by excision and were treated on arrival at hospital by modified excision and free drainage instituted.

Foreign bodies were removed at the time of primary operation in 9 cases, at a later date in 8 cases, and not removed in 11 cases.

The majority of the other thigh wounds were large, gaping wounds with involvement of large amount of muscle and nearly all infected.

*Bone Injury.*—There were 6 cases of fracture of femur, comminuted, and 1 fractured patella.

*Nerve Injury.*—1 division of sciatic nerve ; 1 complete drop foot ; 1 partial drop foot which recovered.

*Vessel Injury.*—3 cases of injury to femoral artery with puncture of wall—two already described.

*Amputations.*—There were 4 amputations of thigh—3 primary before admission to the G.H. and 1 for sepsis following ligation of wounded femoral artery.

*Average stay in hospital.*—

36 discharged to convalescent depot after average stay of 51 days.

22 transferred to Australian General Hospital, Free French Hospital or Indian General Hospital after average stay of 42 days.

4 boarded to U.K. after average stay of 114 days.

3 transferred to P.O.W. camp after average stay of 11 days.

4 to duty R.T.U. after average stay of 54 days.

*Infection of the thigh* wounds was the most common complication and in several cases there was evidence of anaerobic cellulitis clinically, and in one case of gas-gangrene infection of the biceps femoris muscle, which was excised, and the wound treated with M & B 693 powder supplemented by oral sulphapyridine. This case developed no further symptoms.

The only method of preventing and dealing with infection is free and meticulous excision, local and general treatment with sulphonamide and infrequent or closed dressings of the adequately drained wound.

(3) WOUNDS OF LEG totalled 94, of which 51 were due to *G.S.W.* and 43 to splinter wounds.

*Foreign bodies* were removed in 8 cases and were left alone in 16.

Four of the *G.S.W.s* were *through-and-through* wounds.

There were 4 amputations in this series, all done prior to admission to our hospital.

The wounds were associated with *fractures* in 28 cases, i.e. a little over 28 per cent of wounds of leg were associated with fractures.

The tibia and fibula were fractured in 6 cases ; the tibia alone in 19 cases ; the fibula alone in 3 cases.

*Nerve injuries* complicated the wounds in 8 cases—the posterior tibial nerve in 1 case, the anterior tibial nerve in 1 case, and the common peroneal nerve in 6 cases.

*Vessel Injury.*—There were 3 cases of blood-vessel injury accompanying wounds of leg—one of the anterior tibial artery, one of the posterior tibial artery, and one of the popliteal artery.

The average stay in hospital for wounds of the legs was as follows :—

44 were discharged to 1 B.C. depot after an average stay of 42 days.

41 were transferred to other hospitals after a stay averaging 30 days.

7 were returned to their units after an average stay of 36 days.

2 were boarded to United Kingdom after an average stay of 79 days.

(4) WOUNDS OF THE FOOT accounted for a total of 38 cases, and of these 31 (or 81 per cent of the cases) had *fractures*.

(1) Os calcis was fractured in 11 cases (4 bilateral).

(2) Talus alone was fractured in 2 instances.

- (3) Talus and navicular in 2 instances.
- (4) Navicular alone was fractured in 1 instance.
- (5) Cuboid and metatarsals in 1 instance.
- (6) Multiple fractures of tarsus in 1 instance.
- (7) Metatarsals and phalanges in 12 instances.
- (8) Os calcis, cuboid and talus in 1 instance.

Foreign bodies were removed in 4 cases and left in 5 cases.

The causes of the fractures were :—

- (i) Due to G.S.W. in 24 cases.
- (ii) Due to splinters in 7 cases.
- (iii) Due to land mines in 7 cases.

#### *Disposal.*

18 were discharged to convalescent depot after 42 days.

13 were transferred to other hospitals after 23 days.

3 were discharged to unit after 48 days.

4 were discharged to United Kingdom after 148 days.

There were 2 cases of mid-tarsal amputation and 2 cases of amputation of toes performed.

In one case amputation was for gangrene of 2nd and 3rd toes and was performed in our hospital ; the others were done prior to admission.

(5) WOUNDS IN THE REGION OF THE KNEE-JOINT accounted for 23 cases : of these, 8 were penetrating wounds of the joint, 15 of the wounds were due to G.S.W. and 8 to splinter wounds.

In 6 cases foreign bodies were removed from the region of the joint, and in 4 cases the foreign bodies were left.

Nine wounds in this region were complicated by fracture :—

- (i) The patella in 2 cases.
- (ii) The patella and femur in 1 case.
- (iii) The femoral condyle (med.) in 1 case.
- (iv) The tibial condyle in 3 cases.
- (v) The fibular head in 2 cases.

There were 2 cases of wounds of the popliteal artery requiring ligature and the common peroneal nerve was involved in 2 cases.

The disposal and length of stay in hospital were as follows :—

- (1) 12 cases to con. depot after average stay of 42 days.
- (2) 5 cases to other hospitals after average stay of 17 days.
- (3) 2 cases to their units after average stay of 5 days.
- (4) 2 cases to duty after average stay of 67 days.
- (5) 2 cases to U.K., boarded, after average stay of 49 days.

#### *Result on leaving hospital—stiffness.*

Of the 16 cases discharged to their units, duty and convalescent depot, 10 had good movement of the knee-joint despite the fact that foreign bodies were left in 2 cases, 6 had limitation of flexion, and all of these were through-and-through wounds, and of these 4 had fractures and 1 had locking ? and 2 effusion.

(6) WOUNDS IN REGION OF HIP-JOINT.—These numbered 7, and 4 of these cases were wounded by explosion of land mines and had fractures of the pelvis.

(7) WOUNDS OF UPPER EXTREMITY.—These totalled 122, i.e. 25 per cent of the total were wounds of upper extremity. Of these 53 or 43 per cent were complicated by fracture and 24 or 19 per cent had wounds of other parts of the body.

Foreign bodies were removed either at the time of primary operation or later in 14 cases, and in 15 cases the foreign bodies were left in. 70 of the wounds were due to G.S.W. and 52 were caused by splinters.



*Fractures* were present in 53 of the cases :—

Humerus fractured in 9 cases.

Radius and ulna fractured in 7 cases.

Radius alone fractured in 6 cases.

Ulna alone fractured in 6 cases.

Carpal bones fractured in 5 cases.

Metacarpals fractured in 12 cases.

Metacarpals and phalanges fractured in 4 cases.

Phalanges fractured in 4 cases.

*Involvement of Joints.*—The shoulder-joint was involved in 1 case only, the elbow-joint in 4 cases, in 2 of which the olecranon was shattered, and in 1 of which the radial head was shattered.

The radio-carpal joint was involved in 2 cases and the carpal joint in 1 case where there was associated fractures of lower end of radius, hamate, triquetrum, scaphoid and base of 5th metacarpal.

*Nerve Injuries.*—Injury to nerves occurred in 13 cases as follows :—

Incomplete lesion of radial nerve in upper third of arm in 1 case.

Complete lesion of median in forearm wound in 1 case, and complete lesion of median and ulnar nerves in wound of upper arm in 1 case.

In the other 10 cases the ulnar nerve was involved :—

Complete lesion in shoulder wound in 1 case.

Incomplete lesion in upper arm wound in 1 case.

Complete lesion at elbow in 2 cases.

Incomplete lesion at elbow in 1 case.

Complete lesion in forearm in 1 case.

Incomplete lesion in forearm in 3 cases.

Incomplete lesion in hand in 1 case.

Six of these 10 ulnar nerve lesions were showing signs of clearing up, or had recovered, on the patients leaving hospital.

*Blood-vessel Injuries.*—There were 2 cases of wounds of the radial artery in lower third of forearm. In both cases injury had been overlooked at the primary operation and severe hæmorrhage from a traumatic aneurysm occurred, requiring ligature and transfusion in both cases.

*Through-and-through* wounds occurred in 16 cases in which no other treatment than dressing the wounds had been adopted. The hand was involved five times, the forearm five times, the shoulder region twice and the elbow, upper arm, axilla and deltoid regions once each. In these 16 cases the average stay in hospital was 21 days.

Several wounds had been excised and sutured at forward stations, and in all these cases infection was definitely encouraged by the sutures, which were removed on admission.

*Amputations* in upper extremity wounds totalled 13.

- (1) Guillotine upper arm performed prior to admission.
- (2) Lower third forearm performed prior to admission.
- (3) Mid third forearm performed prior to admission.
- (4) At wrist-joint performed prior to admission.
- (5) Thumb blown off at M.C.P. joint prior to admission.
- (6) Fifth finger blown off at M.C.P. joint prior to admission.
- (7) Amputation thumb at M.C.P. joint.
- (8) 1st, 2nd, 3rd and 4th fingers amputated at M.C.P. joints.
- (9) Thumb, 1st and mid fingers amputated at M.C.P. joints.
- (10) Index finger amputated at M.C.P. joint.
- (11) 1st, 2nd and 3rd fingers amputated at M.C.P. joints.
- (12) 4th and 5th fingers amputated at M.C.P. joints.
- (13) 5th finger amputated at M.C.P. joint.

The *disposal* of cases and average stay in hospital for upper extremity wounds was as follows :—

- 53 cases to the convalescent depot after average stay of 45 days.
- 41 cases to other hospitals after average stay of 25 days.
- 20 cases to duty after average stay of 29 days.
- 1 case boarded to U.K. after stay of 12 days.
- 7 cases to P.O.W. camp after average stay of 17 days.

In 3 cases there was marked limitation of movement of the elbow-joint and in 6 cases stiffness of fingers was marked—extension of fingers and flexion of the elbow were the movements restricted.

(8) HEAD AND NECK WOUNDS accounted for 48 patients or 9 per cent of the total. 17 of these were complicated by fracture, and 9 had wounds in other parts of the body. Of these wounds 27 were due to G.S.W. ; 9 were due to splinters ; and 12 were due to bomb wounds.

*Fractures.*—Of the 48 cases, 6 had fractures of skull, 7 had fractures of mandible, and 4 had fractures of maxilla.

*Foreign bodies* were removed in 7 instances and left alone in 4, viz. (1) in cerebellum, (2) body of sphenoid, (3) parietal lobe, and (4) in the neck behind the œsophagus.

*The eye* was irreparably damaged and enucleated in 5 cases.

*Disposal.*—The maxillary and mandibular fracture cases were sent to the Facio-Maxillary Unit and numbered four. One case was transferred to the Neuro-Surgical Unit.

8 cases returned to unit after an average stay in hospital of 27 days.

16 cases were sent to the convalescent depot after an average stay of 30 days.

17 cases were transferred to other hospitals after an average stay of 61 days.

4 cases sent to P. of War camp after an average stay of 18 days.

3 cases died in hospital after average stay of 15 days.

Deaths were due to (1) rupture of cerebral abscess into ventricle twenty-four hours after admission : (2) F.B. in cerebellum and meningitis ; (3) G.S.W. jaw died under anæsthetic.

(9) CHEST WOUNDS numbered 35—7 per cent of the total.

27 were due to G.S.W. and 8 to shell or bomb wounds. 13 of these cases had wounds in other parts of the body. 9 were non-penetrating wounds.

*Foreign bodies* were present in 7 of the cases in the following situations :—Left lung, 4 cases ; right lung, 2 cases ; diaphragm, 1 case.

*Fractures* of ribs or shoulder girdle were present in 5 of the 35 cases. There were 21 cases of intra-thoracic complications : Hæmo-pneumothorax was present in 2 cases ; hæmothorax was present in 15 cases ; hæmothorax with collapsed lung in 3 cases ; broncho-pleural fistula in 1 case.

*Hæmoptysis* was present in only 3 of these cases.

In *Hæmothorax* cases treatment was :—(1) 10 cases treated by rest alone—average stay in hospital 30 days. (2) 3 cases treated by aspiration—average stay in hospital 88 days. (3) 2 cases treated by rib resection and closed drainage on account of infection—average stay in hospital 96 days.

*Disposal.*

5 returned to duty after average stay of 18 days.

14 sent to convalescent depot after average stay of 36 days.

14 transferred to other hospitals after average stay of 50 days.

2 transferred to P.O.W. camp after average stay of 16 days.

(10) WOUNDS OF TRUNK AND SPINE.—These totalled 12—4 being wounds due to G.S.W. and the remaining 8 to shell or bomb fragments.

*Bone injury* was present in 4 cases and in 3 of them foreign bodies were embedded in the vertebral bodies, and in 1 case in the spinal canal. None of these foreign bodies were sought for, and altogether foreign bodies were removed in 3 out of the 12 cases.

There were 2 cases where the spinal wound was complicated by *hæmothorax*. In 1 case there was complete paraplegia at level of 4th and 5th dorsal vertebræ, and in another involvement of body of 2nd lumbar vertebra with affection of the femoral nerve.

The others were mostly shell-splinter wounds and their disposal was as follows :—

- 5 returned to their unit after an average stay of 11 days.
- 3 transferred to convalescent depot after an average stay of 27 days.
- 3 transferred to other hospitals after an average stay of 19 days.
- 1 died after 12 days in hospital.

(11) GENITO URINARY WOUNDS.—There were 6 cases of this type, 2 due to G.S.W. and the rest to splinters.

The two G.S.W.s were interesting :—

(1) Pte. B., wounded on 30.6.41—sustained :—

- (i) Superficial entrance and exit wounds anterior aspect right thigh.
- (ii) Bullet passed through corpora cavernosa causing hæmaturia but no obvious injury to urethra—small entry and exit wounds of penis.
- (iii) Superficial entry and exit wounds anterior aspect left thigh, and
- (iv) lacerated wound outer aspect of left thigh where the bullet had ricocheted after hitting a coin in left trouser pocket and lodged there.

The wounds were excised and treated with M & B 693 powder on 3.7.41, and he made a good recovery.

(2) Fus. W., G.S.W. perineum, entrance at side of anus. Laparotomy performed at C.C.S. ; projectile had gone through the right side of bladder, exit near right kidney. Perforated small gut sutured and cystostomy. Recovery.

The other 4 cases were all splinter wounds of the scrotum, 2 of them superficial and 2 accompanied by hæmatocele of tunica vaginalis, one of which became infected and required incision and drainage.

(12) ABDOMINAL WOUNDS numbered 6—4 due to G.S.W. and 2 to splinters. All had signs of visceral damage and were operated on either at C.C.S. or hospital within twelve hours of wounding.

LATE COMPLICATIONS of war wounds were largely due to sepsis and included :—

(1) *Abscess formation* round retained foreign bodies.

(2) *Thrombosis*, usually femoral, from sepsis in the thigh and notoriously staphylococcal in origin.

(3) *Sequestrum formation*, requiring sequestrectomy, was a frequent complication, and it was our practice to rely largely on the result of the X-ray examination in deciding when to remove sequestrum. In the upper extremity it was usually four to six weeks before the sequestrum was removed, and in the lower extremity eight to twelve weeks before the sequestrum was separated.

(4) *Causalgia* was a complication encountered in G.S.W. of buttock and thigh. Characterized by burning pain of great intensity, vasomotor disturbances and marked hyperæsthesia. The suggestion that the condition is caused by irritation of the peri-arterial sympathetic fibres is upheld, as there was no spinal nerve lesion associated.

(5) *Hæmorrhage from Traumatic Aneurysm*.—This complication, alarming in its onset and trying in its treatment, occurred in four cases :—

- (i) In radial artery in upper third forearm.
- (ii) In anterior tibial artery in upper third leg.
- (iii) In femoral artery in lower third thigh, and
- (iv) In popliteal artery.

All four cases had sustained through-and-through G.S.W.s and the wounds had primarily been treated at C.C.S. In none was there any evidence of interference with the circulation

of the limb below the lesion. All started bleeding copiously from their wounds which in two of the cases were enclosed in plaster of Paris.

In all, after transfusion of citrated blood, the wounds had to be opened up and in all, except one, after clearing away a mass of organizing blood clot, a small gaping wound was discovered in the wall of the artery involved. In all four cases, proximal and distal ligation of the affected vessel was carried out, and the collateral circulation already developed, even in the case of the popliteal, was sufficient to preserve the limb. In one case amputation had to be carried out at a later date for sepsis.

(6) *Staphylococcal Septicæmia*.—There were two cases of this, both originating in G.S.W. thigh, and one of these had, ultimately, to have his thigh amputated.

*Results*.—Of the 488 cases treated, there was only one case of clinical gas gangrene and none of tetanus. There were four deaths in the series.

#### SUMMARY AND CONCLUSIONS.

(1) The closed plaster treatment combined with controlled chemotherapy is the ideal treatment of war wounds. The comfort and painless healing is in marked contrast to the painful and shockful methods which were in vogue in the last war. Just as the Winnett-Orr treatment of osteomyelitis converted the post-operative treatment of that condition from months of acute physical and mental suffering to a comparatively painless convalescence free from the agony of frequent dressings, so has the closed plaster treatment operated in war wounds. Where plaster of Paris treatment is impossible, the aim should be infrequent wound dressings—using acriflavin or euglamide.

(2) Primary suture has no place in war wounds.

(3) The importance of *Transfusion* of large amounts of blood in cases of hæmorrhage and of repeated small (250—500 c.c.) transfusions of *freshly* citrated blood in septicæmia cannot be over-rated.

(4) While the closed plaster treatment hastens the process of granulation in large wounds it appears to delay the epithelialization of such wounds, which process is stimulated by air and by light—U.V.R.

(5) *Disposal of Cases from Hospital*.—The statistics given for the average duration of stay in hospital in this paper are vitiated by reason of the transfer of cases to other hospitals before treatment was complete. This rapid emptying of General Hospitals to make room for fresh cases is one of the great drawbacks and interferes with the continuity of treatment which one is accustomed to in civilian practice.

I am indebted to my first Commanding Officer, Colonel E. V. Whitby, who was A.D.M.S. of the area during the time these casualties were admitted.

### **Editorial.**

## ANNUAL REPORT ON THE HEALTH OF THE ARMY IN INDIA FOR THE YEAR 1942.<sup>1</sup>

In his introduction the Director of Medical Services says :—

*"The health of the Army for 1942, while not so good as in former, particularly pre-war years, is considered to have been on the whole reasonably satisfactory, taking into account the many adverse factors present throughout the year.*

*The year 1942 was one of great strain for the armed forces in India and, as an inevitable result, the health of the troops, both British and Indian, suffered. The various factors which contributed to this are discussed in the body of the report.*

*An examination of the statistics (see Tables 4 and 51 of the report) of the war years 1915-1918 shows that the sick rates during these years were also very high—in some cases higher than in 1942. Yet the years 1915-1918 were for India years of peace, with troops living in cantonments ; whereas 1942 saw India turned into an armed camp with the majority of troops living under conditions of active service in unhealthy areas outside cantonments. Taking these facts into consideration, the war year of 1942 has produced a surprisingly good health record and one that compares favourably with the average year of the period 1915-1918."*

In this report the Eastern Army is considered separately.

The incidence of disease in India has been affected by the following factors : (a) The continued effect of a war waged outside India ; (b) the marked regression in the downward trend, which, with the exception of 1941, had been apparent for the last ten years, in the incidences of malaria ; (c) the continued upward trend in the incidence of venereal diseases ; (d) the marked regression in the downward trend, which had been apparent for the last seven years, in the incidence of sandfly fever in the North-Western Army ; (e) the very high incidence rate of incidence for the dysentery-diarrhoea group of diseases ; (f) the presence of civilian native labour ; (g) the formation of camps in malarious areas ; (h) epidemic malaria—the year 1942 was a year of epidemic malaria among the civil populations of Central and Northern India ; and (i) the evacuation of Burma.

The least healthy station was Bannu with a total admission ratio per 1,000 of 2,857·1—death ratio 3·21—average constantly sick 79·71. Meerut, however, with an admission ratio of 1,748·4, death ratio 17·97, and A.C. sick 84·20 would appear really less healthy.

The stations with ratios above all India were : Bannu, Meerut, Peshawar, Lahore, Karachi, Rawalpindi, Razmak, Delhi and Bombay. Lower than all India were Alipore, Mhow, Quetta, Ahmednagar, Sialkot, Jubbulpore, Madras, Poona, Secunderabad, Bangalore, Deolali and Nowshera. Curiously enough the highest A.C. sick was at Bangalore (87·52) and the lowest at Madras (14·97). The highest death ratios were Meerut (17·97), Lahore (9·99), Razmak (8·02), Jubbulpore (13·57) and Deolali (9·70).

### MALARIA.

The following reasons were given for the high incidence rate (164·1) : (a) Operations in the malaria season in hyperendemic areas against the Hurs in Sind and against the tribes in Waziristan. (b) Intensive training in malarious areas. (c) Civil disturbances during the malaria season necessitated the location of small bodies of troops in numerous intensely malarious areas where few antimalaria measures were possible. (d) Increased movements of units and drafts during the malaria season, a large proportion of whom became infected whilst travelling at night by rail and road. (e) Rapid expansion into new areas and camps

<sup>1</sup>In this Editorial the Health of the British Troops only is considered.

before antimalaria measures in such places could be organized. (f) Lack of antimalaria knowledge and discipline on the part of troops compared to their well-trained predecessors of 1937 and 1938.

#### ENTERIC GROUP OF FEVERS.

The admission ratio per 1,000 has increased from 0.9 in 1941 to 1.6 in 1942. This ratio, although it interrupts somewhat the steady and progressive decline in the incidence of this group of diseases over the past fifteen years, is still far below what it was fifteen years ago and is of course only a fraction of the ratios prevailing in India among British troops in pre-inoculation days. That only 16 British soldiers in every 10,000 contracted a fever of the enteric group during a year like 1942, with the enemy at the gate of India, with almost daily arrivals of unacclimatized British troops in India, with intensive training going on in camps situated among civil populations among whom the disease was rife and with water supplies stretched to breaking point, is considered to be a remarkable testimony to the efficacy of preventive inoculation with T.A.B. vaccine. It is of even greater significance that in Eastern Army, where active operations were taking place under the most adverse climatic conditions and with hordes of civilian refugees from Burma streaming through Assam and Eastern Bengal, the incidence of the enteric group of fevers was only 1.9 per 1,000. The British Army owes a great debt to the laboratories at Millbank and Kasauli for the provision of such a potent vaccine.

#### DYSENTERY AND DIARRHŒA GROUP.

Compared to 1941 the admission ratio has increased from 92.3 to 125.7. There is an efficient vaccine for the enteric group but none for the dysentery group. The following factors are listed: (a) Camp conditions with primitive sanitary conditions; (b) carelessness about sanitation and food protection by officers and men brought up under modern conditions; (c) stations crowded with Indian recruits; (d) neglect of principles of sanitation by contractors constructing hutted camps; (e) lack of guidance to siting Boards; (f) the sanitary standard of messes, clubs, hotels and restaurants has markedly declined; (g) increase in dust nuisance; and (h) the bulk of the population at risk, being young and newly arrived in India, were lacking in that immunity to bacillary dysentery which the seasoned resident in India normally acquires.

#### MINOR SEPTIC DISEASES AND LOCAL INJURIES.

These have remained remarkably constant during the last thirteen years and it is noted that intensive training often in jungle country has had little effect in raising the ratio of incidences compared with the years of peace.

#### MENTAL DISEASES.

The incidence ratio has risen from 2.8 in 1934 to 5.3 in 1942 but the invaliding ratio has dropped from 1.23 to 0.89.

It is suggested that a large number would not have been admitted to hospital at all had the medical officers been as experienced as their pre-war Regular confrères.

It is not clear whether a distinction has been drawn between Psychoses and Psychoneuroses. It was, in 1942, too early to form any opinion as to the effect of an increase in the Establishment of Psychiatrists.

#### SCABIES.

The incidence ratio has increased from 1.4 in 1935 to 15.5 in 1942. The report says "scabies infestation among British troops in India is almost always the result of illicit sexual intercourse."

## CYSTICERCOSIS.

Only 3 cases of this occurred during 1942. We presume this means that only 3 cases were discovered.

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The report deals rather briefly with the Health of the Eastern Army, stressing the adverse local conditions. The most prevalent disease was malaria (Eastern Army 334.7, Rest of India 164.1).

With the exception of dengue (38.6 and 11.6) the other disease incidence ratios were much the same. Cholera in the Eastern Army was 0.5 and in the Rest of India 0.0. Venereal diseases were much the same (E.A. 72.2 ; R.o.I. 69.6). The attractions of Calcutta are considered largely to blame although other unnamed towns are not exonerated.

## MENTAL DISEASES.

*Eastern Army 2.5, Rest of India 5.3.*

The explanation given is that large numbers of cases subsequently diagnosed as mental diseases were evacuated to hospitals in the Rest of India and there diagnosed. This may well be so but, in peace years, the ratio was always lower in the Frontier Districts where the troops were under conditions more like active service than the Rest of India. It will be interesting to read the reports for the years 1943 *et seq.* to see the effect of subsequent campaigns. We hope that the effects of selection may be noted in future reports.

## HYGIENE.

The report deals at some length with antimalarial measures. It is quite obvious that, at long last, adequate funds have been provided and that energetic measures have been introduced.

The role of "malariologists" has been revised and the Establishment of Antimalaria Units with Civilian Medical Officers and civilian assistants in addition to Officers is resulting in a very thorough campaign which should have lasting results. It was, of course, too early for any mention of D.D.T. We agree whole-heartedly with the statement, "the problem of dealing with malaria in India has by no means been solved but it is felt that the results so far achieved represent a considerable advance towards this goal."

The training of Officers and other ranks has been taken in hand in no uncertain manner.

Water supply has been satisfactory.

The final section deals with "food and its control." Future research into the local product "amala" (spelled seven lines later as "amla") may result in a locally produced antiscorbutic of no mean value. It would be interesting to know if the Pharmacological branch of the Haffkine Institute have this in hand.

The whole report reflects great credit on the Medical Directorate and the Medical Services as a whole for the satisfactory state of the health of the Army in India.

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## Clinical and Other Notes.

### SCHEUERMANN'S DISEASE (Osteochondritis Juvenilis)

THIS is a form of adolescent curvature of the spine affecting the thoracic vertebræ. It is a condition which is not so rare as had been thought and is being discovered quite frequently. The ætiology is unknown—in some cases trauma may play a part.

**Anatomical Pathology.**—A thoracic vertebra is ossified from three primary centres, two for the neural arch and one for the body. At about the sixteenth year five secondary centres appear—one for the tip of each transverse process, one for the extremity of the spinous process and two epiphyseal plates, one for the upper and the other for the lower surface of the body (the ring epiphyses). These fuse with the rest of the bone about the age of 25 years.

Scheuermann's disease affects the epiphysal plates. Decalcification occurs, then fragmentation, resulting in "wedging" of the vertebral body. Later, reconsolidation takes place.

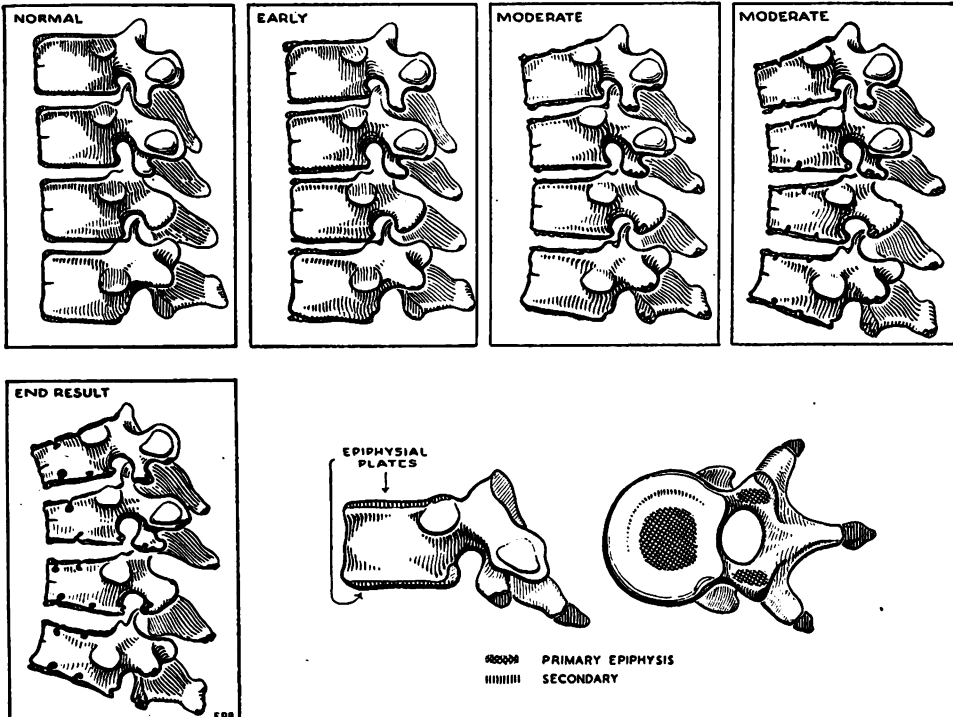
**Clinically.**—The condition occurs in children or young adults—it affects the lower thoracic vertebræ (6 to 10) and causes pain in the back and kyphosis. It is relatively common and often unrecognized, the condition being ascribed to "growing pains." After local consolidation has occurred there may be quiescent intervals extending for several years. These are followed by osteo-arthritis of the spine with irregular bone formation, pain and deformity.

**Treatment.**—In the initial stages immobilization of the spine in a plaster jacket may slow down the progress of the disease and effect consolidation in good position. No really curative treatment is known.

In the later stages treatment and disposal in the Service are serious problems. Attempts to correct and straighten the kyphosis are injurious. These must strain and interfere with the consolidation. Exercises to strengthen the spinal muscles and to help to develop the compensatory curves may be beneficial.

The patient is unlikely to be fit for a category higher than "C" and employment involving lifting and carrying is definitely contra-indicated.

J. M. W. and E. S.



The diagrams are the work of Sergeant E. A. Alexander, Royal Army Medical Corps.



## AN INQUIRY INTO THE PROPHYLACTIC, SUPPRESSIVE AND CURATIVE PROPERTIES OF MEPACRINE (ATEBRIN).

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and

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## INTRODUCTION.

THE experiments and observations reported below are part of an investigation on the prophylactic, suppressive and curative action of mepacrine (atebrin) carried out by members of a Malaria Field Laboratory. Labushayne, in Java, and Field, Niven and Hodgkin, in Malaya, had reported previously that mepacrine in weekly doses of 0.4 gramme was sufficient to maintain health in labour camps in highly malarious areas. It was further suggested by these authors that mepacrine in the above doses acted not only as a suppressive drug but had true prophylactic properties. Other reports reaching this laboratory confirmed the previous results and further stressed that mepacrine had a specific action in preventing malaria in all cases where a preliminary two to three weeks' suppressive treatment was administered before exposure to infection. The preliminary mepacrine doses, reaching a certain concentration in the body, had, according to these reports, a specific cumulative action on the primary phase of the development of the malaria parasite.

To obtain further information on the true value of mepacrine (atebrin) as a prophylactic and curative drug with plasmodium strains of the Middle East (A) a hospital investigation and (B) a field observation were undertaken.

## (A) TECHNIQUE.

A group of 17 patients from the Mental Hospital of Asfouria (Lebanon) was kindly placed at our disposal by the Director, Dr. Stuart Miller. All the patients suffered from various mental disturbances of the schizophrenia type and malaria therapy had already been decided on in each of these cases. The age-group of the patients varied between 18 and 40. They belonged to different races and nationalities, 4 being of European origin, 6 Lebanese, 4 Armenians, 1 Turkish and 1 Negro Senegalese. No case of general paralysis was included in this group. The previous history of the patients showed no evidence of malaria infection. No splenic enlargement was found and a microscopical examination of their blood (with the thick drop method) on two occasions did not reveal any parasites. The patients were divided into two groups.

*Group 1.*—8 cases received a three weeks' preliminary course of suppressive mepacrine twice a week on alternative days (0.4 gramme twice weekly). At the end of this period the patients were experimentally infected with malaria by allowing infected mosquitoes to feed on them and subsequently injecting subcutaneously the remaining sporozoites obtained by dissection in saline. The patients continued the suppressive treatment for another month. A second dose of sporozoites was administered to each of them during this month of suppressive treatment.

*Group 2.*—This group consisting of 8 patients started suppressive treatment on the day of their experimental infection and continued it for a month. A second dose of sporozoites was administered to all of them during the month of suppressive treatment.

*Group 3.*—The seventeenth patient was used as a control and received one dose of sporozoites and no suppressive treatment.

**Source of Infection.**—The infected mosquitoes used for the experiment were laboratory bred *A. sacharovi* and *A. superpictus* experimentally infected from gametocyte carriers of the hyperendemic Aamique Village (Bekaa Plain, Lebanon), and infected *A. sacharovi* obtained from the Malaria Research Station of the Hebrew University, Rosh Pina (North Palestine).

## GROUP 1.

Patient's number	Age	Nationality	Pl. species	Infection
1	26	Lebanese .. ..	<i>Pl. vivax</i> ..	Both salivary glands and infected stomach of 1 <i>A. sacharovi</i> subcutan.
2	19	European .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and both salivary glands subcutan.
3	30	Lebanese Arab ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. superpictus</i> and both salivary glands subcutan.
4	32	Lebanese .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and both salivary glands subcutan.
5	25	European .. ..	<i>Pl. vivax</i> ..	Both salivary glands from 2 <i>A. superpictus</i>
6	28	Armenian .. ..	<i>Pl. vivax</i> ..	Bites of 2 <i>A. sacharovi</i> and salivary glands from 1 <i>A. sacharovi</i>
7	37	Turkish .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and both salivary glands and stomach subcutan.
8	24	Negro Senegalese..	<i>Pl. falciparum</i>	Bite of 1 <i>A. sacharovi</i> and both salivary glands subcutan.

## GROUP 2.

9	30	European .. ..	<i>Pl. vivax</i> ..	Both salivary glands from 2 <i>A. sacharovi</i>
10	39	Lebanese Arab ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and both salivary glands
11	22	Armenian .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. superpictus</i> and both salivary glands
12	34	Armenian .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and 1 salivary gland
13	26	European .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and 1 <i>A. superpictus</i> and both salivary glands subcutan.
14	28	Lebanese .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and both salivary glands subcutan.
15	20	Armenian .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. superpictus</i> and both salivary glands
16	36	Armenian .. ..	<i>Pl. vivax</i> ..	Both salivary glands of 2 <i>A. sacharovi</i> subcutan.

## GROUP 3 (CONTROL).

17	23	Lebanese .. ..	<i>Pl. vivax</i> ..	Bite of 1 <i>A. sacharovi</i> and both salivary glands subcutan.
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**Administration of Mepacrine.**—The patients were isolated in one ward. The mepacrine tablets were administered after meals under medical supervision. The patients took the suppressive treatment willingly as sugar rations were issued to them immediately after the swallowing of the drug. Temperatures were taken twice daily (morning and evening) during the whole period of the experiment and blood slides were obtained and examined from all cases of fever above 99°F. (38°C.). The results of the infections and the dates are summarized in the table below :—

## GROUP 1.

Patient's number	Mepacrine started	Mepacrine ceased	First infection	Second infection	Result of infection (Date of attack with positive blood finding)
1	12.8.43	1.10.43	30.8.43	19.9.43	Negative
2	12.8.43	1.10.43	30.8.43	19.9.43	11.10.43
3	12.8.43	1.10.43	30.8.43	19.9.43	10.10.43
4	12.8.43	1.10.43	30.8.43	19.9.43	Negative
5	12.8.43	1.10.43	30.8.43	19.9.43	Negative
6	12.8.43	1.10.43	30.8.43	19.9.43	27.9.43
7	12.8.43	1.10.43	30.8.43	19.9.43	25.10.43
8	12.8.43	1.10.43	30.8.43	19.9.43	8.10.43

## GROUP 2.

9	4.9.43	5.10.43	4.9.43	22.9.43	Negative
10	4.9.43	5.10.43	4.9.43	22.9.43	Negative
11	4.9.43	5.10.43	4.9.43	22.9.43	7.10.43
12	4.9.43	5.10.43	4.9.43	22.9.43	Negative
13	4.9.43	5.10.43	4.9.43	22.9.43	14.10.43
14	4.9.43	5.10.43	4.9.43	22.9.43	23.10.43
15	4.9.43	5.10.43	4.9.43	22.9.43	Negative
16	4.9.43	5.10.43	4.9.43	22.9.43	Negative

## GROUP 3 (CONTROL).

17	—	—	4.9.43	—	20.9.43
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## (B) FIELD OBSERVATIONS.

During the summer of 1943 observations were made on a battalion of Indian Infantry with a view to finding out, *inter alia*, whether (a) mepacrine was a useful suppressant, and (b) whether continuation of treatment for one month after leaving the malarious area cured any substantial proportion of suppressed infections.

The battalion was located in a highly malarious frontier zone, some of the posts being situated on the frontier itself, across which it was not possible to adopt anti-larval measures. A battalion stationed in the same area in 1942 not on suppressive treatment had a severe epidemic of malaria, 130 cases being notified in the week ending 25.7.42. At a visit to the area on 25.7.43 the conditions which had prevailed in the previous year were found to exist, i.e. gorged females of *A. sacharovi* were prevalent in the huts and tents of the frontier posts with epidemic malaria in the neighbouring village, almost the whole population of which was infected.

In 1943, in the occupying battalion, which was on carefully controlled suppressive treatment, only two cases of malaria occurred whilst it was in the same area.

The battalion was withdrawn to a healthy camp site on 1.9.43 and half (approx.) ceased taking mepacrine immediately (Group A), half continuing with mepacrine in normal doses for another month (Group B).

The after-history of those men who had been located on the frontier itself and who had therefore to rely mainly on suppressive treatment was:—

GROUP A.		GROUP B.	
Strength	Malaria cases (per cent)	Strength	Cases (per cent)
92	16 (17.1%)	106	Nil

## CONCLUSIONS.

It is clear, from the Asfouria Hospital experiments, that a preliminary three-weeks' suppressive mepacrine treatment before exposure to sporozoite infection had no causal prophylactic effect in preventing primary malaria (plasmodium strains from North Palestine and from Syria). In both groups cases of malaria occurred:—

Group	Strength	Cases of malaria (per cent)
1	8	5 (62.5 per cent)
2	8	3 (37.5 per cent)

All malaria cases, except patient No. 6, developed the primary attack after termination of the suppressive treatment. Some of the patients had classical malaria paroxysms in the initial stages. In others a milder remittent or intermittent fever developed in the early days of the attack. In all positive malaria cases parasites had been detected in the blood.

From the field observations it is apparent that mepacrine is a highly efficient suppressant. It is also clear that 17 per cent (approx.) of those who stopped taking suppressive mepacrine on ceasing to be at risk subsequently developed malaria, whilst none who continued to take mepacrine in normal suppressive doses for a month (which is the equivalent in quantity of an atabrin course of five days) developed the disease.

During a Discussion on modern drugs in the prevention and treatment of tropical diseases at a meeting of the Royal Society of Tropical Medicine on 14.7.43, Dr. W. D. Nicol said:—

"It might be worth while to put on record a small experiment carried out by us at Horton. Four patients, who are up and about and working, one of whom was working for some five hours a day in the insectarium, where the temperature was 80°F. and the humidity 80, were infected with a Roumanian strain of *P. falciparum*. These patients were divided into two pairs, one pair taking 0.1 gramme atabrin daily for six days each week, a total of 0.6 gramme weekly; the other pair 0.2 gramme, Saturdays and Sundays, a total of 0.4 gramme weekly. Both pairs took atabrin for three weeks prior to infection and they were bitten twice weekly for three weeks, the mosquitoes being heavily infected. At the end of this trial period the pairs were divided, i.e. one patient with the daily dose and the other with the week-end dosage; one pair continued the drug for four weeks after the last infection and the second pair for

eight weeks. In no case was there any fever nor were any parasites found. It is worth recording that throughout the period of these experiments in no case was there a fall in the hæmoglobin content. Two control cases infected at the same time by the same batch of mosquitoes developed fever and parasites within the normal incubation period. Our interpretation of the success of these experiments is that sporozoites themselves were destroyed soon after they were injected by the mosquito."

In view of our findings it would appear that a more probable interpretation of the Horton experiment is:—(a) That the sporozoites were not destroyed as a result of the premedication soon after they were injected, and that (b) the patients were cured of their infection whilst it was still at a sub-clinical level by the courses of treatment, four weeks and eight weeks respectively, which they received subsequent to infection.

#### SUMMARY.

(1) The purpose of an investigation on the prophylactic, suppressive, and curative properties of mepacrine (atebrin) by experimental infections and field observations is stated.

(2) Experimental infections of mental patients who had received premedication with mepacrine are described.

(3) Observations in the field on the value of mepacrine both as a suppressive and curative agent are recorded.

The following conclusions are reached:—

(a) Mepacrine is not a true prophylactic.

(b) Mepacrine is a useful suppressant.

(c) Mepacrine, if continued for a sufficient period, cures infections at a sub-clinical level.

(d) An interpretation of the Horton experiment is advanced.

#### LEPTOSPIROSIS ICTEROHÆMORRHAGICA : AN UNUSUAL CASE.

By Captain C. D. ALERGANT, M.B., Ch.B., M.R.C.S., L.R.C.P.,

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[Received February 9, 1945]

THE occurrence of a typical form of this not uncommon disease is well recognized and the varied clinical picture makes a satisfactory classification somewhat difficult. Thus Martin and Pettit [1] recognize the following clinical varieties:—

(1) Cases with grave icterus.

(2) Cases of the true febrile jaundice type with febrile recrudescence: (a) benign catarrhal; (b) prolonged febrile; (c) meningeal; (d) with nervous syndrome; (e) pulmonary.

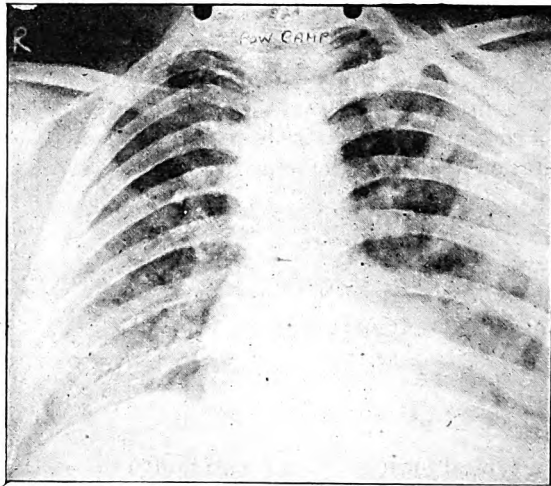
To these Willcox and Fairly [2] would add an *anginal* and an *abdominal* variety.

The following case presents a most unusual combination in that there was clinical evidence of pulmonary, meningeal, hepatic and renal involvement at one and the same time and in one and the same patient. It serves to emphasize that infection with *Leptospira icterohæmorrhagiae* is essentially a *septicæmia* in which one or more organs may be singled out for special attack or none at all. Clinical and pathological involvement do not necessarily run parallel—hepatitis is probably more common than the incidence of jaundice would suggest—nevertheless clinical evidence of hepatic and renal damage is common, of meningeal involvement distinctly less common, and of pulmonary involvement decidedly rare. As might be expected from pathological considerations the pulmonary lesion is a patchy hæmorrhagic consolidation. The radiological appearances in this case at the height of the infection are well seen in the accompanying photograph.

## CASE HISTORY.

The patient, S.P., a male aged 22, a native of Voroshilovgrad in the Donetz, was admitted to hospital direct from a local P.O.W. cage late in the evening of September 11, 1944, with a provisional diagnosis of pulmonary tuberculosis. No clinical notes were available. In the absence of an interpreter it was impossible to obtain any history: it was learnt later that since his capture four days previously he had been complaining of headache, pain in the upper part of the left chest and blood spitting. His bowels had not been opened for four days prior to admission but had been opened that day. There was no complaint of urinary symptoms. There was a history of typhus in 1933 and of malaria in 1943.

*Examination* revealed a well-developed youth of distinctly Mongolian appearance. He looked ill and somewhat toxic. Temperature 101.4°F., Pulse 112, Respirations 28. His skin was hot and dry and his tongue was furred. Examination of the chest revealed no mediastinal displacement. The heart was not enlarged clinically, a short mitral systolic murmur being the only cardiac abnormality detected. Anteriorly chest movements were equal and good; the percussion note was unimpaired and breath sounds were vesicular. Posteriorly, there was diminished movement and impaired percussion note at the left base, and an area of bronchial breathing with superimposed fine crepitations, corresponding approximately to the left lower lobe. No pleural friction was felt and no rub was detected on auscultation. There was generalized abdominal tenderness but no rigidity. The liver,



spleen and kidneys were not felt and were not palpable at any stage of the illness. There was slight neck rigidity but no other evidence of any meningeal irritation. Knee-jerks and ankle-jerks were present and equal and plantar responses were flexor. Expectoration was free, the sputum consisting of a moderate amount of mucopurulent material together with small discrete blobs of bright red blood. A provisional diagnosis of left basal lobar pneumonia was made and a course of sulphathiazole was instituted—2.0 g. statim and 1.0 g. four-hourly.

The following morning the patient was re-examined and in the improved light was seen to be jaundiced. Re-examination of the chest no longer suggested lobar consolidation—the only positive findings were localized areas of harsh breath sounds at both bases. The patient's general condition was unchanged. A chest X-ray was ordered and a specimen of urine was sent to the laboratory with a request for chemical and microscopical examination.

The chest X-ray was reported on as follows: "Old healed T.B. right apex and first and second interspace right side. Both lung fields show extensive fluffy cotton-wool mottling especially in lower and middle zones. The hilar shadows are not markedly increased. *Conclusions:* Extensive patchy consolidation probably inflammatory. (1) Bronchopneumonia. (2) T.B. (3) Reticular type primary atypical pneumonia." The urine, in addition to bile, contained a small amount of albumen with hyaline and granular casts in considerable numbers.

The combination of pyrexia, jaundice, evidence of renal damage and hæmorrhages inevitably raised a suspicion that we might be dealing with a case of Weil's disease and further investigations were undertaken with this in mind.

On September 13, two days after admission, there was still no appreciable change in the patient's general condition; the hæmoptyses were rather less, but on the other hand neck rigidity was a little more pronounced and Kernig's sign was now positive. A lumbar puncture was performed and was reported on as follows: "Faintly turbid fluid under increased pressure. Protein 20 mgm., Cells 205 per c.mm. and roughly 50 per cent Polymorphs and 50 per cent Lymphocytes, Chlorides 720 mgm. Culture: 'Air-borne contaminants only.'" Red and white cell counts performed the same day revealed a moderate anæmia—R.B.C. 3,850,000 per c.mm. Hb. 83 per cent, C.I. 1.04 and a relative and absolute polymorphonuclear leucocytosis, —W.B.C. 13,500 per c. mm., Polymorphs 82 per cent, Lymphocytes 10 per cent, Monocytes 6 per cent, Eosinophils 2 per cent. Blood urea on 13th was 50 mgm. and a blood culture taken at the same time remained sterile. Sputum examination was repeatedly negative for tubercle bacilli.

There was considerable improvement in the patient's condition on the 14th. The temperature, which had fluctuated between 100° F. and 102° F., dropped to 98° F. on the morning of the 14th and there was a corresponding drop in the pulse-rate, and although there was an evening rise to 100.8° F. the temperature dropped to 99° F. the following morning and remained at that level for the following three days. At the same time the jaundice became fainter, the cough and expectoration diminished and all evidence of meningeal irritation disappeared.

Sulphathiazole was discontinued on the 18th after a total of 39.5 g. had been given. The patient's general condition was now excellent and his appetite unimpaired. Further chest X-rays were taken on the 14th and on the 22nd. The former showed a combination of confluence of the mottled opacities previously seen combined with some resolution, whilst the latter showed the bronchopneumonic condition almost completely resolved. Urine examination on the 18th showed only faint traces of bile and albumin and absence of casts, whilst on the 20th all trace of albumen had disappeared.

Every attempt was made to confirm the diagnosis by demonstration of the causal organism. On the 13th a dark-ground examination of the blood was carried out but proved negative, and blood culture failed to grow any *Leptospiræ*. Following alkalization a centrifuged urinary deposit was examined on three occasions after the 10th day of illness with negative results on each occasion. No guinea-pigs were available for inoculation. The diagnosis remained unconfirmed until September 29, when the result of a sero-agglutination test on a specimen of blood taken a week earlier was returned as positive at a titre of 1:300. Ten days later the titre had risen to 1:10,000.

There was a brief but characteristic recrudescence of pyrexia beginning on the 22nd and reaching a peak of 102.8° F. on the evening of the 24th. The temperature returned to normal on the 26th and remained normal during the further fortnight he was under observation. This secondary pyrexia was accompanied by renewed malaise, increased cough and expectoration, and a slight increase of icterus which had never completely disappeared. These features rapidly disappeared when the temperature returned to normal and on discharge the patient was symptom-free apart from a slight cough, and the jaundice had completely cleared. During the latter part of his stay in hospital the patient was up and about and enjoyed a very healthy appetite.

#### DISCUSSION.

*Leptospirosis icterohæmorrhagica* must enter into the differential diagnosis of every case of jaundice associated with pyrexia, although in this case the added presence of pulmonary and meningeal symptoms presented a most bewildering clinical picture. In atypical cases the mode of onset with severe, often agonizing, muscular pains and the presence of conjunctival hyperæmia may suggest the correct diagnosis. Thus Witts [3], in a recent article describing two cases of *Leptospirosis icterohæmorrhagica sine icterus*, was enabled to reach a correct diagnosis as a result of observing these two characteristic features. That they may on occasion be absent is demonstrated by the above case in which there was at no time any complaint of pain in arms or legs nor the slightest suspicion of conjunctival injection.

A striking feature of the case was the complete absence of any hæmorrhages into the skin

and visible mucous membranes ; nor did the urine contain any red blood cells. It is most unusual for hæmoptysis to be the sole manifestation of the hæmorrhagic tendency which is such a marked feature of the disease.

Finally, it is worth while considering whether the administration of sulphathiazole modified the course of the disease in any way. In this case improvement followed exhibition of sulphathiazole and relapse occurred when the drug was discontinued. On the other hand the temperature settled and the clinical condition improved after the relapse in the absence of any form of specific therapy. Obviously it would be unwise to draw any conclusions from a single case, particularly as it is generally agreed that sulphonamides have little or no effect in infections due to *Leptospira icterohæmorrhagiae*, but in the absence of both anti-leptospiral serum and penicillin, sulphonamide therapy might be considered worthy of trial.

My thanks are due to Lieutenant-Colonel C. McComas, R.A.M.C., Officer i/c of a Medical Division, for permission to report this case ; to Major D. P. King, R.A.M.C., for innumerable tedious pathological investigations ; and to Captain H. C. Knox, R.C.A.M.C., for the photograph of the X-ray.

#### REFERENCES

- [1] MANSON. " Tropical Diseases," Eleventh Edition, 1942.
- [2] PRICE, ED., " Textbook of the Practice of Medicine," Sixth Edition, 1941.
- [3] B.M.J., 1944.

#### Review.

CATALOGUE OF LEWIS'S MEDICAL, SCIENTIFIC AND TECHNICAL LENDING LIBRARY. New edition, revised to the end of 1943. PART I: Authors and Titles. Pp. 714. PART II: Classified Index of subjects with names of authors. Pp. 208. London: H. K. Lewis & Co., Ltd. 1944. Price to subscribers, 12s. 6d. net ; to non-subscribers, 25s. net.

A copy of the above has been received and placed in the Library, Royal Army Medical College.

#### Notices.

#### ARMY MEDICAL DEPARTMENT BULLETIN.

*A.M.D. Bulletin* No. 44, February, 1945, has now been published by the War Office. Distribution scale : One copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

##### Article No.

- 335 *Trench Foot*.—Trench foot has caused little trouble in the British Army during this war because methods of prevention have been understood and applied. General principles and details are discussed.
- 336 *Laboratory Diagnosis of Smallpox*.—A microscopic method can be used as an aid to clinical diagnosis, but it is emphasized that success demands practice ; the technique has been fully described in an original article (*Brit. Med. J.*, 1944, October 21, 526) which should be consulted by any who mean to use this method.
- 337 *Varicose Veins*.—The indications for treatment in the Army have a functional and not a cosmetic basis. Simple injection without operation is not therefore recommended. Full details are given about when and how to operate.
- 338 *Mental Factors in Skin Disease*.—Can certain types of skin disease be related to definite psychological groups ? A contributor has outlined his ideas.
- 339 *Peripheral Nerve Palsies from Intramuscular Injections*.—Badly given intramuscular injections can have disastrous results. The sites for intramuscular injections, in order of preference, are : (1) Outer side of the thigh ; (2) upper and outer quadrant

of the buttock ; and (3) pectoral muscles. The upper arm should be used only for subcutaneous injections and these should be given above the level of the deltoid insertion to avoid possible injury to the radial nerve.

- 340 *Too Much of a Good Thing.*—In gas gangrene, adequate dosage of antitoxin is of vital importance ; in combination with good and early surgery and penicillin, energetic use of antitoxin has helped to give the remarkable recovery rate of 78·4 per cent in 222 cases among allied troops on the western front. But M.O.s are inclined to overdo post-operative administration of antitoxin, dosage being determined by the convenience of prescribing an overdose as a routine instead of being regulated by the observed degree of toxæmia. This advice should do nothing to lessen enthusiasm for generous dosage in the early stages and adequate dosage after operation.

# NOTES ON USE OF ABBREVIATIONS " A.M.S.", " LATE R.A.M.C." AND " R.A.M.C." " A.M.S."

- (A) From September, 1884, until June, 1898, Medical Officers and Quartermasters received commissions in the ARMY MEDICAL STAFF, while other ranks enlisted in the MEDICAL STAFF CORPS. In June, 1898, both ARMY MEDICAL STAFF and MEDICAL STAFF CORPS ceased to exist when by Royal Warrant they were amalgamated to form the " ROYAL ARMY MEDICAL CORPS."

Only those officers who held a commission in the ARMY MEDICAL STAFF may use the abbreviation " A.M.S."

- (B) To-day " A.M.S." signifying ARMY MEDICAL SERVICES does not apply to officers but designates those Army Medical, Dental, Nursing and associated services administered by the Director-General, Army Medical Services.

It will be seen, therefore, that the use of " A.M.S." by any officer commissioned to the R.A.M.C. on first appointment is incorrect and meaningless.

## " LATE R.A.M.C."

When a Lieutenant-Colonel holding a Regular R.A.M.C. commission is promoted to the substantive rank of Colonel he is " removed from the R.A.M.C." and placed on the General List of Colonels in the Army. Should he wish to indicate his former Corps he usually describes himself as " late R.A.M.C." or, if retired, " late R.A.M.C.(Retd.)."

## " R.A.M.C."

An officer holding a commission in the R.A.M.C. who has NOT been removed therefrom on promotion to *substantive* Colonel should describe his Corps as " R.A.M.C." " R.A.M.C." is correct for acting, temporary and brevet-Colonels, and for Lieutenant-Colonels and under.

The following extracts from the " Royal Warrant for the Pay, Appointment, Promotion, and Non-effective Pay of the Army, 1940," give the definition of the ranks referred to above :—

### PART II.

" SUBSTANTIVE RANK " shall include all rank except brevet, honorary, local, acting, temporary, or war substantive rank.

" REGIMENTAL RANK " shall mean rank in Regiment or Corps.

### ART. 178.\*

" ACTING RANK."—In times of emergency, officers who are called upon to perform duties of a rank or appointment higher than their substantive rank shall be granted corresponding acting rank.

### ART. 181.\*

" TEMPORARY RANK."—An officer performing the duties of a higher rank during a

\* See footnote on page 196.



national emergency shall be granted temporary rank after holding paid acting rank for the following qualifying periods :—

Up to and including Lieutenant-Colonel	..	3 months.
Colonel	.. .. .	6 months.
Major-General and above	.. .. .	1 year.

ART. 182.\*

“WAR SUBSTANTIVE RANK.”—An officer on being granted temporary rank under Article 181 shall be granted war substantive rank one grade lower than the temporary rank. Such war substantive rank shall be tenable for the duration of the war provided that the officer's services are satisfactory throughout.

ART. 212.

Officers of the substantive rank of Colonel shall be removed from Our Royal Army Medical Corps.

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From the above it may be seen that an officer of the R.A.M.C. commissioned as Lieutenant, R.A.M.C., may find himself situated as follows :—

Substantive rank : Lieutenant, R.A.M.C.

War substantive rank : Lieutenant-Colonel, R.A.M.C.

Temporary rank : Colonel, R.A.M.C.

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R.A.M.C. OFFICERS' WIDOWS' AND ORPHANS' FRIENDLY SOCIETY.

THE one hundred and thirtieth annual general meeting will be held in the card room of the R.A.M.C. Headquarter Mess, Millbank, on Thursday, May 31, 1945, at 14.00 hours.

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ROYAL ARMY MEDICAL CORPS FUND AND OFFICERS' BENEVOLENT SOCIETY.

THE annual general meeting of subscribers will be held in the Library of the Royal Army Medical College on Monday, June 4, 1945, at 14.00 hours.

\* NOTE.—As to the conditions under which Acting and Temporary ranks are held, see Army Council Instructions to this Article on page 45, Royal Warrant for Pay, etc., 1940.

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Authors are alone responsible for the statements  
made and the opinions expressed in their papers.

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# Journal of the Royal Army Medical Corps.

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## *Original Communications.*

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### MEDICAL ASPECTS OF AIR LANDING OPERATIONS IN THE EAST.

By Major H. POZNER, M.C.,  
*Royal Army Medical Corps.*

[Received February 26, 1945.]

THE spectacular progress of logistics in global warfare has materially affected the organization of the medical services in the field. This is very apparent in the eastern theatres of war where a campaign in all its complexities may be likened to the ripples of disturbance created by a stone thrown into a pool, the concentric circles representing alternating formations of friend and enemy.

Wherever there are combatants it is axiomatic that there must be the spearheads of the medical services, capable of functioning adequately as self-contained units. In consequence, the problems of medical equipment, maintenance and evacuation have assumed a much wider scope and significance. In the interim between the two World wars, the concept of the basic field medical unit, the Field Ambulance, was that of a cumbersome organization, inadequately mechanized and heavily laden with ordnance and medical equipment, suitable only for static trench warfare and incapable of fulfilling its role in a hard war of rapid movement. The first campaign in Flanders drove this fact home, the desert battles emphasized the need for mobility, and the protracted bitter struggles in the jungles of Burma laid stress on the importance of improvisation and the power of the parent Field Ambulance of being able to split up into many smaller medical sub-unit entities. Parallel with the development of sea- and air-landing forces and the formation of long range deep penetration patrols, there was a necessary progressive modification of medical establishments, until finally in the organization of the parachute medical units was realized the optimum compromise between compactness and utility.

The importance of such advances cannot be overstressed, since ultimately all these efforts at an efficient re-organization tend towards the removal of any undue time-lag between the moment a soldier is wounded and his reception into an adequate treatment unit, with a resultant diminution in man-power wastage. In South-East Asia where there is no formal battle front, and a campaign may consist of a series of isolated actions, a successful conclusion is influenced by two main factors. The lines of communication are long, uncertain and vulnerable to weather and enemy infiltration, and the constant vectors of disease may devitalize and eventually immobilize an army. Consequently an air-transported medical organization, independent of land routes, and capable of being rapidly switched to sectors

where disease or battle casualties necessitate medical reinforcements, assumes an increasingly greater importance.

The use of air-transported forces in an operational role implies fundamentally a priority in transport of essential equipment and personnel.

The nature of the equipment is governed by the scope of the operation and the types and numbers of aircraft available, and the economy in personnel is compensated for by a much higher standard of training in which every man can be used as a specialist in various capacities. This principle, together with those of distribution, tactical loading and duplication form the basic problems for all arms. Only operational experience can determine what a unit commander will prefer to take in the initial assault landings, but it is certain that medical detachments must be included in the first wave. From previous airborne operations it is apparent that the employment of an air-landing Field Ambulance is best based on its division into independent self-contained sections with a small central administrative headquarters. Each of these sections forms a standard aircraft load, and can be used alone as a small staging section, with the battalion medical personnel, in the formation of an emergency dressing station or, in conjunction with a surgical team, as an advance surgical treatment centre. Of the other divisional medical units, combatant commanders assert that it is important to have competent field hygiene detachments well up amongst the forward air-transported troops.

Aircraft loads, standard for men and equipment, are highly desirable since this ensures an even distribution of the essential stores and, in the eventuality of an aircraft being lost, the functioning efficiency of the medical unit as a whole will not be seriously impaired. Tactical loading implies that the personnel of each aircraft are capable of functioning immediately on landing as a medical or medical-auxiliary sub-unit. With this object in view, men skilled in first-aid, nursing and resuscitation, together with such basic equipment as stretchers, blankets, lanterns, and picks and shovels, are allotted as far as possible to each aircraft. The policy of attaching Medical Corps personnel to combatant units so that they become an integral part of the air-landing battalion group is one to be recommended and encouraged.

The air portability of motor transport suitable for medical purposes has provided many problems in modification. With the resources available, it is considered that the most useful vehicles are the Jeep car and the Jeep trailer. A great deal of ingenuity has been shown in the conversion of these into ambulance carriers. A Jeep car, which can carry three stretcher cases, can be loaded into the C-47 and Hadrian glider, and is invaluable over jungle terrain. The limitations in aircraft, freight and space, preclude the transport of motor vehicles in the maximum requisite numbers and, therefore, the use of animal transport has also to be considered in detail. In no case of air-landing operations in jungle warfare can the availability or effective employment of motor transport be absolutely guaranteed. This, then, must result in modifications in the existing methods of carrying equipment. It is necessary that all the essential equipment should be capable of being transported in man-packs, each weighing about twenty pounds, and all developmental work on equipment must be governed by the three criteria of lightness, portability and durability. The medical equipment affected by this mainly consists of the heavier items such as operating tables, lighting sets and anaesthetic apparatus. Stretchers and blankets, for which there is a constant demand, can be dropped by parachute at any given rendezvous according to the requirements.

The original conception of air-landing troops was that they would be used as an assault force to take and consolidate the region of the landing zone until contact had been established with relieving forces, and lines of communication, both by air and land, secured. In practice this has not always been realized, and the medical units of an air-transported force must be prepared to collect, treat and accommodate casualties for an indefinite period. The casualties incurred in the initial landing operations must be demarcated from those due to the subsequent action, and here there appears a division of medical responsibility. Those medical units

which are parts of the advancing combatant formations can only afford, within their limited resources, to take care of casualties from the offensive spearhead. After the first wave, certain formations with medical detachments have the sole function of occupying and maintaining the landing area, and theirs is the responsibility of collecting the casualties from the actual landings, and later on of receiving and evacuating the casualties from the advanced medical units.

The problem of suitable hospital accommodation in this theatre, unlike that of Europe, is acute. Tentage, air-portable shelters and improvisations of tarpaulins and parachute canopies all serve a useful purpose in an emergency, but what is needed as soon as possible at an air-landing base is the refinement of spacious, well constructed, weather-proof buildings, suitable for holding and treating the most serious surgical cases. The answer to all this appears to be the air-portable, prefabricated medical hut of which several satisfactory designs have already originated from the U.S.A. Such huts can be expanded by the unlimited addition of similar units to form a static hospital of any required capacity.

The commitments of a medical unit in action daily become greater as the battle passes from the initial assault through the peak period to the phase of static warfare where there is a constant small intake of casualties. In operations of the type considered in this article, casualty evacuation may be difficult, delayed or even impossible, and the supply and maintenance of expendable medical stores and equipment becomes a matter of some importance. Parachute supply is often the only way of maintaining isolated formations, and a great deal of experience of this procedure has been obtained during the campaigns in Burma and the Arakan. The obvious decision in the question of the maintenance of medical units is that there must be a standard second line supply drop, which will consist of surgical, medical, hygiene and comforts packs, together with replenishments for heating and lighting sets. These supplies can be dropped in panniers, special containers and bundles automatically each day and can be used to build up a reserve for the stage when the demands on the medical unit are suddenly increased. This method of maintenance is considered to be desirable except in the case of blood and blood-plasma. Here, quite rightly, responsible authorities assert that an automatic supply of these items is uneconomical, since any plasma which is unused would add an appreciable weight to the light scale equipment of a mobile forward unit and would probably be wasted where there were no facilities for keeping it at a suitable temperature. Blood-plasma, therefore, need only be dropped on a specific demand.

The final problem of medical administration is the evacuation of casualties. In previous operations, air evacuation has been largely a matter of improvisation, using whatever aircraft were available, but now an organization, which is rapidly expanding, has been established and has proved its efficiency over a long trial under difficult conditions. On the ground, bearers, mules and Jeep cars are used according to the terrain and the supply of air-transported vehicles. The ideal is to have air evacuation bases as far forward as possible, and for this many varieties of aircraft have been pressed into service. The standard casualty evacuation aircraft in the Fourteenth Army is the C-47 (Dakota) and this proved to be invaluable as a medical maid-of-all-work. The C-46 (Commando) has a larger capacity, but its numbers are limited. Light American aircraft of the types L.1 and L.5 are used well up where there are short rapidly constructed emergency landing strips, but from experience it is found that the great drawback to this undoubtedly valuable means of evacuation is the extremely limited accommodation for stretcher cases. Gliders have also been used, and now that the procedure of "snatching" glider ambulances from jungle air strips, inaccessible to powered aircraft, is being rapidly developed, the potentialities of glider evacuation have become considerably increased. Helicopters, although extremely vulnerable to enemy attack and possessing a small passenger capacity, can and have been used by the Allied deep penetration columns with advantage in special circumstances. And lastly, the flying boat has its own special niche in the co-ordinated scheme of air evacuation, a role which was admirably demonstrated during the recent campaigns in the interior of Burma.

The training of ambulance personnel in the loading of casualties into aircraft has become

a necessary and specialized function. Rapid, efficient loading is essential not only because of the necessity of clearing the aircraft from a strip in the forward zone where enemy attack is possible, but also because the effect of the tropical sun's rays on the fuselage of a stationary aircraft renders the interior uncomfortably warm and humid, a state which when unduly prolonged can have only a deleterious effect on wounded personnel.

The medical problems peculiar to forces operating in the Far East are intensified in the case of air-transported troops, who must be prepared to live in a most insalubrious environment and fight in isolated detachments with the minimum of medical aid and without the advantage of a fixed line of evacuation with its chain of treatment centres. It is essential, therefore, that every individual of an airborne formation should have a reasonable practicable knowledge of first-aid and medical prophylaxis. Malaria, dysentery, heat exhaustion, fatigue, unbalanced or restricted diet and water deficiency are the main factors which affect the health and so directly the effectiveness of a combatant unit.

The prevention of malaria and dysentery is largely a matter of prophylaxis and the adherence to the discipline of sanitation and hygiene. The remaining factors can be minimized by acclimatization and training. Since health under these conditions is so much more a personal responsibility, interest is now being focused on the provision of a special individual medical pocket pack which will have as its bulk content sulphaguanadine together with morphine tubonic ampoules and other essential drugs in tablet form. The main problem is to explain to untutored native troops the occasion, the dosage, the precautions and the necessity of an adequate water-intake, particularly in the case of sulpha-compounds, in the self-administration of these drugs.

Troops used in air-landing operations should be temperamentally and organically sound, and it has been ably demonstrated by the late General Wingate that second line troops of a low medical category can be raised to an exceedingly high standard of physical fitness and morale by a carefully graduated scheme of training, making demands not only on a soldier's endurance but also on his intelligence and powers of appreciation. The more specific problem is the prevention of air-sickness and a number of investigations concerning this have been carried out on air-crews and airborne personnel. The final conclusion appears to be that air-sickness may be activated by a variety of factors, organic, environmental and psychological, most of which are but vaguely understood. Hyoscine is the accepted active constituent of air-sickness remedies, but it is controversial as to whether it is desirable to administer any drug which may result even temporarily in lowering the efficiency of a combatant at a time when it should be at its peak, an effect which is stated occasionally to occur in mass experiments. The really severe cases of chronic air-sickness form only a very small percentage of the total number of troops being trained for an airborne role, and if those are weeded out immediately on the observation of their initial reactions to air experience, much will have been done to decrease man-wastage from this source.

The demands of war have given the greatest impetus to the progress of air-transportation and its potentialities for the future are vast. In any scheme of post-war reconstruction there must surely be a place for an air-transported medical organization, bringing the remotest corners of the globe in contact with the latest advances in skilled medical and surgical aid. War has provided the blue-print and the experience, and an international air medical service may well prove to be a most potent weapon in the unending battle against disease and disaster.

I am indebted to Lieutenant-Colonel J. E. Viney, *O.B.E.*, for permission to submit this article for publication, to Colonel P. R. Wheatley, *D.S.O.*, for his encouragement, and to the Staff Officers of the Air Transport Development Centre for their valuable suggestions and co-operation.

## INFECTIVE HEPATITIS IN NIGERIAN TROOPS.

By Major S. ORAM, M.D.Lond., M.R.C.P.,

*Royal Army Medical Corps.**Medical Specialist to a Military Hospital in British West Africa..*

[Received September 1, 1944.]

DURING the past seventeen months some 230 cases of infective hepatitis have been met with in native soldiers in Northern Nigeria where the disease is both endemic and epidemic. It is realized that they are of necessity a selected age-group but, from experience at two local civilian hospitals for Africans, it is considered that the disease in women, children and elderly males differs in no clinical essentials from that occurring in soldiers. In view of certain differences in the clinical picture as recorded in Europeans, and the difficulties of differential diagnosis peculiar to West Africa, it was considered of interest to record this analysis.

Ætiologically, two distinct types of case occur, namely those following inoculation with incorrectly prepared yellow fever vaccine or infected serum—so-called homologous serum jaundice—and those in which no yellow fever vaccine has been given or, if given, has been heated for at least thirty minutes at 56° C. [1]. The present series of cases is of the latter type. There is evidence to show that both types of case are caused by the same virus, the difference in incubation period being due to different portals of entry. In the cases which have not received vaccine the infection is probably a droplet one entering through the upper respiratory tract [2]. But Ford has suggested [3] that the mode of spread, especially in children, may well be by faecal contamination conveyed by fingers and these conditions are ideal in Africans who eat all their food with their fingers and do not use toilet-paper.

*Monthly Incidence.*—This was as follows: January 20, February 24, March 39, April 15, May 8, June 9, July 10, August 4, September 9, October 40, November 29, December 23. It is seen that the heaviest incidence falls in the period from October to March. This is the Harmattan season during which the days are hot and dry, due to the Harmattan wind blowing down from the Sahara, and the nights are cold, sometimes bitterly so; in round figures the temperature ranges from 40° F. to 90° F. It is suggested that the crowding of troops for warmth at night, rather than the wide diurnal temperature fluctuation, is responsible for the increased infection rate. This certainly is the cause of outbreaks of cerebrospinal fever and pneumonia, both well-known droplet infections. It is interesting to note that, among the Nigerian Army (Africans) in 1943, the peak month for pneumonia was February and for cerebrospinal fever March.

*Symptomatology.*—This is best illustrated by quoting a few typical cases from Table I. It is seen that joint pains occurred in twenty-one cases and in no case did erythema multiforme crop up although in two urticaria was present. Stiff joints and erythema multiforme, together with splenomegaly, are generally considered features of post-inoculation jaundice [4] but not necessarily so [3]. Possibly the strains of virus vary. Despite severe jaundice only four patients complained of pruritus and this has been observed by other writers [5]. Coryza and sore throat were uncommon and were probably coincidental. The average number of days in hospital for all types of case was 22.6, the extreme being from eight to sixty-six days. In an epidemic at Omdurman the duration of disease averaged twenty-three days and ranged from two to seven weeks [6]. The mortality, namely 3 per cent, would appear to be considerably higher than in European cases. For example 300 cases at Wembley showed a mortality of only 0.3 per cent. The post-inoculation cases in the American Army had a mortality of 0.2 per cent [7]. The spleen in the Wembley cases could not be felt but chronic malarial splenomegaly is so common in Africans that no conclusions can be drawn from our cases.

## . ILLUSTRATIVE CASES.

It was possible clearly to distinguish six clinical pictures which may be designated as follows: Subicteric or latent case, 13; common benign type, 193; benign hæmorrhagic

type, 9 ; the acute abdominal syndrome, 7 ; cirrhosis and ascites type, 6 ; acute liver necrosis type, 2.

*Subicteric or Latent Case.*—During an epidemic these cases without jaundice are suspected from the history of gastro-intestinal upset following contact with known cases of infective hepatitis. The presence of bile-pigments is easily confirmed by urine examination but we have found that the presence of bile in the urine may be intermittent and several specimens at intervals should be examined. The van den Bergh test we have found unreliable in these very mild or early cases. If any doubt exists in Europeans latent jaundice can be detected by injecting 0.1 c.c. histamine intradermally. Normally a china-white wheal is produced and in jaundice the edges of the wheal turn yellow, then the whole bleb. Unfortunately in Africans this test is valueless.

E. B., aged 20, Hausa tribe.—Complains of feeling weak and unwell for past three days. Began with attacks of nausea and on day before admission began to vomit and this has persisted. Now complains of epigastric discomfort also. Has been constipated for five days. Has been sleeping in same hut as three other members of his unit who have been admitted to hospital with jaundice. His stools prior to admission were normal in colour and he has not noticed any change in colour of his urine. On examination he is apyrexial, pulse-rate 80. There is no evidence of jaundice but he is tender in the mid-epigastrium. The liver is not palpable. The tip of the spleen is palpable but not tender. His other systems are normal.

*Pathological Investigations.*—E.S.R. (4th day of disease) : 12 mm. fall in first hour. Red and white counts normal (4th day) ; van den Bergh (4th day) negative. Urine on admission (3rd day) : no albumin, bile salts or bile pigments and nothing abnormal microscopically. No evidence of sickling of R.B.C.s *in vitro*. Mouse protection test (4th day) : partial protection. Repeated three weeks later : partial protection. Kahn test negative. Blood film : no malarial parasites present.

*Progress.*—During the next three days his condition remained unchanged and his urine was again examined on the seventh day and was returned as : colour amber, faint haze of albumin, a trace of bile salts and bile pigments present, microscopically a few granular casts are seen. His epigastric discomfort and tenderness had gone ten days after admission and his urine on that day was normal.

*Common Benign Type.*—By far the greater number fall into this category (83.9 per cent) and at no time during the illness does the patient's condition give rise to anxiety. These patients are often ambulant and are practically free from symptoms. A common story is that a friend noticed their eyes were yellow. The temperature rarely exceeds 100° F. and is only raised for a few days. Many cases are apyrexial.

A. J., aged 42, Yoruba tribe.—Complains of "belly-palaver" for four days and marked anorexia. Experiences waves of nausea and has retched on several occasions but only vomited once. The vomitus was not blood-stained. Has noticed his stools are "white" but has not noticed any change in colour of his urine or conjunctivæ. On examination he is moderately jaundiced. Temperature 99.4° F., pulse-rate 68. His liver is palpable three fingers-breadth below the costal margin and is tender. The gall-bladder and the spleen are not palpable. His urine is dark greenish-brown and his stools clay-coloured. His other systems are normal.

*Pathological Investigations.*—E.S.R. (4th day) : 32 mm. fall in first hour. Blood film negative. No evidence of sickling of R.B.C.s. Kahn test negative. Blood-count normal. van den Bergh delayed direct on day of admission, one week later the serum gave a direct prompt reaction. Urine (4th day) : dark, moderate cloud of albumin, bile pigments and salts present ; microscopically many bile-stained granular casts are present but no R.B.C.s. Mouse protection test (4th day) : full protection.

*Progress.*—Within four days his temperature settled to normal and he was allowed up at the end of a week. The stool and urine colour became normal during the course of the next few days and two weeks after admission his liver was just palpable but no longer tender. He was discharged to full duty.

*Benign Hæmorrhagic Type.*—It was found that even marked spontaneous hæmorrhage, especially from the nose and gums, was by no means of evil portent. The African diet is not well supplied with vitamins and hypovitaminosis is common. Possibly these hæmorrhagic

cases are in part due to deficient intake of vitamin K and this deficiency may be aggravated by hospital diet unless the possibility is borne in mind.

A. R., aged 32, Ibo tribe.—Complains of bleeding from the gums for past two days which is becoming worse, and this morning experienced a slight epistaxis. No previous history of similar trouble. Has been vomiting on and off for past week but does not feel ill between-times. Has not noticed any jaundice although some of his friends have recently had "yellow eyes." On examination, temperature 98·8° F., pulse-rate 78, general condition excellent. Slight but definite icterus of conjunctivæ. Gums are not swollen or spongy and show simply a diffuse ooze of blood which is increased on pressure. No evidence of pyorrhœa. The pharynx is normal. The nasal mucous membrane is reddened and is oozing blood which has crusted round the nares. Some tenderness is present in the right hypochondrium but neither the liver nor gall-bladder is palpable. The spleen tip is easily felt. The stools are pale and no blood is present. The urine is dark orange in colour.

*Pathological Investigations.*—E.S.R. (3rd day) : 18 mm. fall in first hour. Blood film : no parasites present. No evidence of sickling. Blood count : slight leucocytosis (13,200 cells per c.mm.) with normal differential count. Platelet count : 300,000 per c.mm. Bleeding time : 5 minutes 45 seconds. Clotting time : 4 minutes. Sphygmomanometer test : no petechiæ produced after five minutes with pressure mid-way between systolic and diastolic. Kahn test : negative. van den Bergh (third day) : delayed direct reaction. Repeated five days later : delayed direct reaction. Urine ; faint cloud of albumin, bile present, microscopically a few casts but no R.B.C.s are present. Mouse protection test : full protection.

*Progress.*—The oozing from the gums continued for four days then gradually became increasingly intermittent and ceased altogether on the ninth day. No local treatment was given except hydrogen peroxide. The nose-bleeding stopped three days after admission. No naked-eye blood was ever present in the stool. On the third day the temperature rose to 100·2° F. but never rose higher than that. At no time did the patient's condition give rise to alarm and he was discharged on the fourteenth day. In view of the absence of signs of scurvy and the plentiful supply of citrus fruits locally no ascorbic acid was given. Vitamin K was not at that time available.

*Acute Abdominal Syndrome.*—Seven examples of this have been encountered. In all cases the onset of abdominal pain was sudden and came on between the third and eighth days of disease. Their importance lies in the fact that laparotomy may be considered advisable even in the presence of jaundice by a surgeon with no experience of these cases particularly as the jaundice is not necessarily marked and may be mistaken for the very common pigmented African conjunctivæ. It is considered advisable before any laparotomy is performed in a district where infective hepatitis is known to be occurring that the urine be tested for bile. None of this series was fatal and the underlying pathology remains obscure. Possibly an acute cholecystitis or hydrops of the gall-bladder was present. Although the gall-bladder was never palpable, in one cirrhotic case which did not suffer from this acute abdominal pain a hydrops was found post-mortem (*vide infra*).

M. O., aged 40, Fulani tribe.—Complains of yellowness of eyes and sore throat for past two days and vomiting beginning day of admission. Has had some abdominal discomfort but no pain. On examination his general condition is good. He is moderately jaundiced. Abdomen : tip of spleen palpable, nil else. Urine dark, fæces clay-coloured. Progress satisfactory until fifth day of disease when suddenly experienced extremely severe pain in right hypochondrium which caused him to cry out. The pain did not radiate and no pain was felt in the right shoulder. The patient retched once or twice but did not vomit. On examination he was shocked and occasionally rolled over crying out and holding his abdomen. He stated that the pain was continuous but was worse every few minutes. His pulse-rate was 124, regular and of poor volume. Temperature prior to attack was normal, during attack was 99·8° F., fluctuated for the next five days between 100·2° F. and 98·6° F., and then fell to normal. Respiration shallow and 28 per minute during his first attack. His tongue was dry. No diarrhœa occurred. Abdomen : the whole of the upper part of the abdomen is rigid, the right upper quadrant is board hard and extremely tender. The liver, gall-bladder and spleen cannot be felt. On suddenly withdrawing the hand from the abdomen a definite peritoneal withdrawal reflex is present. Rectal examination is normal. He was given morphia and placed in Fowler's position.



*Pathological Investigations.*—X-ray of liver (3rd day): hepatic shadow normal. No displacement of diaphragm. Stool normal. No malaria parasites present in three films (3rd, 8th and 13th days). White cell counts: (3rd day) 18,400 per c.mm., polymorphs 82 per cent, lymphocytes 12 per cent, hyalines 3 per cent. eosinophils 3 per cent. 8th day: 12,000 per c.mm., polymorphs 78 per cent, lymphocytes 12 per cent, hyalines 8 per cent, eosinophils 2 per cent. E.S.R. (3rd day): 14 mm., 12th day 12 mm. van den Bergh: biphasic reaction. Urine (5th day): albumin a trace, bile present, microscopically normal.

*Progress.*—By the same evening the pain was slightly less and had shifted to the R.I.F. The pain persisted, occasionally abating then recurring, for four days. He then made an uneventful recovery. His liver, gall-bladder and spleen were not palpable at any time.

*Hepatic Cirrhosis and Ascites.*—This complication is well known. In our six cases the time elapsing between the onset of jaundice and appearance of ascites was short namely 21, 6, 9, 21, 72 and 42 days and all were fatal. Cases are on record [9] of cirrhosis developing and the patient recovering. In four of these cases the jaundice lessened markedly and, in one, bile disappeared from the urine, yet the patients condition deteriorated. In the one described below death was due to massive hæmorrhage into the gut and this would appear to be not uncommon [6]. In view of the extensive liver destruction with reduced production of bile this might be accounted for by prothrombin deficiency due to non-absorption of vitamin K and possibly the reduced production of fibrinogen by the diseased liver might also play a part.

A. G., aged (?), Munchi tribe.—Three weeks before admission to hospital he noticed that his eyes were yellow and his urine very dark. One week later his "belly began to swell" and he vomited once or twice. On examination there is a well-marked jaundice of the conjunctivæ. The abdomen is tense with fluid and the umbilicus everted. The liver cannot be felt but the spleen is hard, tender, readily palpable and can be balloted. There is dyspnoea on movement and the percussion note and air entry are impaired at both lung bases. Some œdema is present over the sacral region, legs and feet. The stool is grey in colour. Rectal examination is normal.

*Pathological investigations.*—Urine (on admission): albumin, bile and casts present. Stool: formed, greyish colour, microscopically rhabditiform larvæ of *Strongyloides stercoralis* present. Blood-count: normal except eosinophils 18 per cent. E.S.R.: 27 mm. first hour. van den Bergh: immediate direct reaction. Kahn not done owing to repeated hæmolysis of specimens. Ascitic fluid: clear, straw-coloured, Rivalta test negative (identified as a transudate), cells, four lymphocytes per c.mm., no bile salts or pigments present, culture sterile.

*Progress.*—A few days after admission paracentesis abdominis was performed and eleven pints of straw-coloured fluid were removed over a period of forty-eight hours. The liver was not palpable after this procedure. The ascites rapidly recurred. The jaundice of the conjunctivæ became gradually less marked and five weeks after admission no bile pigments were present in the urine although a trace of albumin persisted. The urinary output fell to 15–20 oz. in twenty-four hours, several intravenous injections of mersalyl were given and although a transient diuresis resulted the ascites was unaffected. His condition gradually deteriorated. An evening rise of temperature of 99° F. to 101° F. persisted throughout but thirty-six hours before death it rose to 104° F. A blood film at that time showed no parasites. Nine hours before death he passed about two pints of altered blood *per rectum* and four hours prior to death he vomited about a pint of fresh blood. He again vomited about two pints of coffee-coloured fluid and died immediately afterwards.

*Post-mortem Report.*—Body of a moderately well-nourished African male. The abdomen is grossly distended. The sclerotics are very faintly icteric. Some œdema of the legs, sacral region, penis and scrotum is present. Brain: weight 42 oz. No yellowness of dura. No malarial parasites in smear. On opening the body the subcutaneous fat and costal cartilages are somewhat more yellow than normal but not markedly so. The peritoneal cavity contains many pints of clear, straw-coloured fluid. Lungs: pleura normal. Right lung 11½ oz., left lung 9 oz. A few small areas of lobular collapse are present. Heart: weight 14½ oz. The pericardial fat is coloured bright orange, muscle pale, valves and coronary vessels normal, intima of aorta stained bright yellow. Liver: weight 33 oz. About half the normal size and pale yellow-pink in colour. The surface is irregular and darker hypoplastic nodules are protruding from paler depressed fibrous areas. Considerable perihepatitis is present. The organ cuts with resistance and the changes in the liver are uniform and are

those of a recent multilobular cirrhosis. Gall-bladder: about three times normal size, has a very thin milky-white wall and contains clear viscid fluid. Spleen: weight 45 oz., greatly enlarged, capsule normal, cut surface dark plum-coloured, the malpighian corpuscles are obscured and prominent intersecting strands of fibrous tissue are present. The appearances are compatible with chronic malarial splenomegaly. Gastro-intestinal tract: the œsophagus is normal and no dilatation of veins at the cardia is present. The stomach and whole length of both small and large intestine are filled with dark sticky altered blood. On washing this away the stomach and intestinal mucosa shows a bright pink blush and many pin-head submucosal hæmorrhages are seen both in the stomach, especially along the lesser curvature, and the intestine. No naked-eye breaches of continuity of mucosa are present. The other organs are normal.

*Acute Liver Necrosis*.—The importance of this group in West Africa is the impossibility in many cases of clinically differentiating it from yellow fever. This is discussed later. Also, in this type of case, we have found the hepatic necrosis to be sometimes patchy in distribution, areas of severe necrosis alternating with comparatively unaffected areas. Thus the removal of a cylinder of tissue 2 mm. by 20 mm. by needle as described by Dible, McMichael and Sherlock [9] might be expected to give a misleading result in these cases and the 1 per cent mortality from this procedure seems hardly justified. These cases may have a fulminating onset.

O. G., aged 25, Hausa tribe.—Complains of pain beneath lower end of sternum beginning three days prior to admission. On day of admission noticed eyes were yellow. Has had continuous fever for past four days and has noticed fæces are pale and urine is very dark. Marked anorexia but no vomiting or hæmatemesis. On examination his temperature is 99.4° F., pulse-rate 58, general condition good but severely jaundiced. Mucosæ colour good. The liver is very tender and easily palpable three fingers-breadth beneath the right costal margin. The spleen is not palpable.

*Pathological Investigations*.—Urine (4th day): fair cloud of albumin, bile present, many granular casts, no R.B.C.s. 6th day: unchanged. 9th day: albumin, a heavy cloud, many bile stained granular and epithelial casts. 15th day: urine almost sets solid on boiling, bile is present, many granular casts are present. 22nd day: as on the 15th day except albumin slightly less. E.S.R. (4th day): first hour 27 mm. fall. Van den Bergh (4th day): delayed direct reaction. 18th day: prompt direct reaction. No sickling. R.B.C.s 4,900,000 per c.mm., W.B.C.s: 15,200 per c.mm., polymorphs 74 per cent, lymphocytes 20 per cent, hyalines 6 per cent. Bleeding time: 8½ minutes. Platelets: 147,000 per c.mm. Coagulation time: 3 minutes 40 seconds. Sphygmomanometer test: normal. Mouse protection test (4th day): full protection.

*Progress*.—On the eighth day of illness the patient had a sudden severe epistaxis and became restless and disorientated. From the next day until death on the 29th day blood oozed slowly from his gums and on one occasion his mouth filled with blood overnight. The epistaxes recurred on the 14th, 15th and 22nd days of the illness. On the 5th day severe protracted vomiting began. This was at first yellow, then became blood-streaked and finally by the 8th day was "black." It ceased on the 11th day and recurred as a typical dark hæmatemesis on the 21st day. Two days before death frank blood appeared in his motions. His restlessness gave way to a stuporose condition, with subsultus tendinis by the 12th day and he never really regained consciousness. He had two epileptiform seizures just prior to death. Suppression of urine was present towards the end. His temperature fluctuated from 99.4° F. to 103.8° F. and his pulse fell as his temperature rose (Faget's sign).

*Post-mortem Report*.—Body wasted. Conjunctivæ deep yellow. No petechial hæmorrhages or bruising present. All the viscera are very deeply pigmented a bright orange colour. The blood is very fluid and dark. Brain: weight 48 oz., congested and rather moist, dura yellow but brain substance normal colour apart from "sooty" malarial cortical pigmentation. No hæmorrhages present. The C.S.F. from the subarachnoid space is uniformly blood-stained. Lungs: right 12½ oz., left 11½ oz. A few recent pleural adhesions are present in the right upper interlobar fissure. Both lungs show numerous subpleural hæmorrhages and on section many close-set hæmorrhagic areas each about ½ in. across are seen (hæmorrhagic pneumonia). Heart: weight 14 oz. Some excess of blood-stained pericardial fluid, muscle wall pale and the mitral valve has a large irregular hæmorrhage within its substance. Liver: weight 62 oz., enlarged about one and a third times normal size. No perihepatitis, firm,

very pale yellow with myriads of red dots of uniform pin-head size scattered throughout the right lobe. The left lobe is uniformly yellow. The gall-bladder is difficult to empty owing to its thick almost tarry contents. Kidneys: Right 8 oz., left 7½ oz. Both are enlarged about one and a half times. Very pale, capsule strips easily and surface is smooth. On section the cortex is seen to be grossly reduced and is very pale in contrast with the dark medulla. The vasa recta and normal architecture of the cortex are unrecognizable. Gastro-intestinal tract: the stomach is distended with dark blood of tarry consistency. Scattered throughout the mucosa, mostly along the greater curvature, are many ragged shallow erosions with irregular edges and pink bases. The other organs are normal.

#### PATHOLOGICAL FINDINGS.

In each of the first one hundred cases mouse protection tests were performed by the late Dr. E. C. Smith, the first specimen of serum being taken on admission and the second some three weeks later. Yellow fever was thus excluded.

The urine in each case was tested for albumin, bile salts and pigments and the centrifuged deposit was examined microscopically. It will be seen from Table I that some degree of

TABLE I.—ANALYSIS OF SIGNS AND SYMPTOMS IN 230 CASES.

	Severity of disease			Total No. of times symptoms mentioned	Total No. of times symptoms not mentioned	Per cent incidence of symptoms
	Mild	Mod.	Severe			
Cases (total 230)	63	78	89			
Average No. Days in Hospital	18.1	21.6	27.6			
Anorexia	15	38	76	129	101	56.0
Indigestion	14	16	42	72	158	31.3
Nausea	28	28	51	107	123	46.5
Vomiting	16	26	32	74	156	32.1
Constipation	5	8	12	25	205	10.8
Lethargy	0	3	12	15	215	6.5
Vertigo	1	0	2	3	227	1.3
Depression	1	8	14	23	207	10.0
Convulsions	0	1	3	4	226	1.7
Coryza, conjunctivitis, pharyngitis	2	4	4	10	220	4.3
Pruritus	0	4	0	4	226	1.7
Pyrexia	34	21	89	144	86	62.6
Bradycardia	9	9	16	34	196	14.7
Abdo-pain preceding jaundice	8	23	36	67	163	29.1
Jaundice preceding abdo-pain	15	28	35	78	152	33.8
Absence of abdo-pain	26	22	27	75	155	32.5
Joint pains	3	8	10	21	209	9.1
Liver enlarged	15	27	49	91	139	39.5
Liver tender	10	21	53	84	146	36.5
Spleen enlarged	40	29	38	107	123	46.5
Spleen tender	1	5	17	23	207	10.0
Gall-bladder palpable	0	0	0	0	230	0.0
Tenderness localized to g-b. region	1	4	5	10	220	4.3
Ascites	0	0	6	6	224	2.6
Hæmorrhagic tendency	3	6	7	16	214	6.9
Urticaria	0	1	1	2	228	0.8
Urine Albumin	57	52	60	169	61	73.4
Bile pigments	51	70	79	200	30	87.3
Bile salts	42	61	71	174	56	75.6
Casts	29	38	81	148	82	64.3
Raised E.S.R.	32	64	89	185	45	80.4
Abnormal white cell count	9	13	17	39	191	16.9
van den Bergh Delayed direct	32	31	67	130	100	56.5
Prompt direct	9	23	34	66	164	28.6

albuminuria was very common (73.4 per cent) and that casts also frequently occurred (64.3 per cent). Although urinary casts are a common finding in the tropics, in many cases the degree of albuminuria and the number of casts showed a remarkable increase with the development of the disease although this event occurring together with pyrexia is said to be almost diagnostic of yellow fever. In no case were leucin or tyrosin crystals found. In the later cases Hay's test for bile salts was given up in favour of the more reliable Oliver's peptone test.

Van den Bergh tests were carried out as a routine early in the disease and in some cases repeated later. Most of the early cases showed a delayed direct reaction but several of those re-tested later gave a prompt direct result.

The erythrocyte sedimentation rate was determined by Westergren's method at least once in each case. As far as can be ascertained this investigation has not been previously carried out on any series of cases. It was found to be raised in 80.4 per cent cases. The highest reading was 118 mm. in the first hour. Although in a few cases it fell to normal before the jaundice had completely disappeared it was found to be of no prognostic value. Often the more serious cases had only a slightly raised reading.

The total and differential white count showed no significant variation from normal but in all seven acute abdominal cases a moderate leucocytosis was present (11,200 to 21,000 per c.mm.). It is stated [10] that usually a moderate monocytosis without polymorph increase occurs and in Edwards' cases in school-children a well marked leucopenia with relative lymphocytosis was found [5]. No case of liver deficiency anæmia, as recorded by Hill and Hausmann [11], was encountered.

Cases showing sickling of R.B.C.s *in vitro* after twenty-four hours were rejected from this series. Malaria and syphilis were also excluded.

*Attempted Experimental Transmission.*—Nine African volunteers were inoculated with varying amounts of serum taken from patients in different stages of the disease and injected forthwith. No infection resulted. At least some of these cases have been under observation for sufficient length of time for infection to have occurred, the incubation period for homologous serum jaundice being up to about four months [4]. It was pointed out by Findlay [12] that the volumes of serum employed were probably too great to cause infection as the "dilution phenomenon" is very characteristic of virus infections. For example if 5 c.c. of a mixture of virus and immune serum is inoculated into an animal there will probably be no infection but if the mixture is diluted say 1 in 100 and then 5 c.c. inoculated it will cause a reaction. Since these experiments Findlay [2] has succeeded in conveying post-inoculation hepatitis to three European volunteers by nasal instillation of nasal washings from infected patients.

#### DIFFERENTIAL DIAGNOSIS.

The diagnosis of infective hepatitis from other causes of jaundice in Africans presents the following difficulties peculiar to this country: the West African is particularly prone to jaundice from causes comparatively rare in Europeans such as pneumonia; a yellowish-brown discoloration of the conjunctivæ with or without yellow pingueculæ is common and must not be mistaken for jaundice; mepacrine staining of the sclerotics in patients treated for malaria or giardiasis is a possibility to be borne in mind; and the endemic diseases which give rise to jaundice are numerous and include malaria and blackwater fever, yellow fever, poisoning from N.A.B. or carbon tetrachloride, both of which are commonly exhibited in West Africa, sickle-cell anæmia, Weil's disease, Ackee poisoning and an endemic jaundice occurring in Northern Nigeria called locally Kukuruku disease and of unknown significance [13].

It is often stated that mepacrine does not stain the conjunctivæ but this is not our experience. About 10 per cent of Europeans receiving suppressive mepacrine show, in addition to well-marked skin staining, bright yellow pigmentation of the conjunctivæ. This is easily differentiated from jaundice by the history of coloration dating from soon after the commencement of mepacrine therapy, the deep yellow urine in the absence of bile salts or pigments, the absence of concomitant symptoms of jaundice and the disappearance of the yellowness on changing to quinine suppressively. If any doubt exists the intradermal histamine test can be employed (*vide supra*). Mepacrine staining gives a negative result.

Of the other diseases which give rise to jaundice the most important, although fortunately the most rare, is yellow fever. From consideration of 230 cases the author is of the opinion that neither at the bedside, nor in the post-mortem room, can yellow fever be differentiated with certainty from infective hepatitis. Indeed, it is well known that many Africans show positive mouse-protection tests signifying a previous attack of yellow fever yet this condition is very rarely diagnosed in Nigeria. It has been suggested that some infective hepatitis cases are really mild cases of yellow fever. That this is not so is shown only by the results of mouse-protection tests and the absence of Councilman lesions and Torres acidophile inclusion bodies

in the liver. The mouse-protection test is, of course, of no help in diagnosis during the attack. Clinical points in favour of a diagnosis of yellow fever are said to be increasing albuminuria with numerous casts, "black vomit" and possibly Faget's sign but it cannot be too strongly emphasized that all these signs occur quite commonly in infective hepatitis and without fatal issue. Also in mild cases of yellow fever, and indigenous cases tending to be mild, there may be no albuminuria or jaundice whatsoever and in any case albumin occurs in only one-third of amaryl cases [14]. Neither is the temperature in Africans with yellow fever of value in diagnosis—"white man big fever, black man little fever" [13].

Sickle-cell anaemia is fairly common and the sicklæmia trait is found in 6 to 10 per cent of Africans [12]. In view of the close similarity which can exist clinically with infective hepatitis all cases showing sickling have been excluded from this series. It has been noticed that sickle-cell anaemia jaundice can occasionally be differentiated from that due to infective hepatitis. In the former the icterus is greenish and the sclerotics are clear instead of the more yellow-orange muddiness in the infective hepatitis cases.

Cases which were known to have received arsenicals, or had a positive Kahn test, or had a history of being treated at some previous date by anthelmintics, were excluded from the present series and no case where the possibility was present of it being one of homologous serum jaundice was included.

Some authorities still maintain that epidemic catarrhal jaundice differs from infective hepatitis. For example Hurst [15] maintains that in catarrhal jaundice the liver is affected late and that gastritis precedes the jaundice and that in most cases of acute infective hepatitis there are no preicteric symptoms of any kind. But in our series of cases 29.1 per cent had a history of abdominal pain preceding the jaundice; in 33.8 per cent the jaundice came first and in 32.5 per cent no abdominal pain was experienced. That observer also states that obstruction to bile flow, organic or functional, is present in these cases. None of our seven cases which came to post-mortem showed obstruction in the extrahepatic biliary ducts and no evidence of duodenitis was present.

#### PROGNOSIS.

The mortality rate was 3 per cent and the primary cause of death was hepatic insufficiency. Most cases made uneventful recoveries and gave no cause for worry but the fatal cases nearly all began as a mild disease and only later developed signs of cholæmia. A diminution in the degree of jaundice nearly always means clinical improvement but in a minority of cases may mean that the patient is developing cirrhosis of the liver. The reason for this is not understood. The erythrocyte sedimentation rate is of no prognostic value. The white-cell count shows no significant variation from normal. The presence of hæmorrhages is not necessarily of serious import.

#### TREATMENT.

A routine procedure was to isolate the patient for a week and to keep him in bed until the temperature became normal. It was considered wise to nurse these cases under a mosquito net for the first five days.

An initial calomel purge followed by sodium sulphate was given in all cases and fluids by mouth were encouraged. For the more serious cases glucose by mouth, in some cases reinforced by insulin injections, was given and to cases showing liver insufficiency 5 per cent glucose saline was administered intravenously.

No special fat-free diet was ordered as the African diet is normally low in fats but, where possible, the consumption of eggs was encouraged owing to their high vitamin K content. It has been stated that vegetable protein is particularly suitable for diseases of the liver [16] but as the Nigerian's staple article of diet is either dawa (guinea-corn) or garri (cassava) it was considered unnecessary to add any other source of vegetable protein.

In one hæmorrhagic case vitamin K was given in large dosage intravenously without effect. No oral bile salts were administered. In some other bleeding cases ascorbic acid was tried by mouth as three 25 mgm. tablets daily but without the dramatic improvement obtained by MacDonald [6].

It is recognized that hypoproteinaemia increases the susceptibility to chloroform and arsenicals and, although no facilities were available for estimating plasma protein, two oedematous cases were given reconstituted plasma with good but temporary effect.

No choline chloride, which in 1 gm. daily doses is said to accelerate fat metabolism in the liver, was available. A few cases are being treated by mouth with pepsin, obtained from unripe paw-paw. Findlay and his co-workers claim beneficial results.

It was decided as an experiment to try convalescent serum on twelve cases. The average period of hospitalization was 16.8 days as opposed to 22.6 days for the whole series and most patients declared they felt better as a result of this treatment, but the number treated is so small and the African is so notoriously fond of injections of any sort that his statements regarding the benefits of parenteral therapy are quite unreliable. No very obvious objective benefits were noticed.

Patients were advised to abstain from alcohol for at least three months. The predominant religion in the Northern Provinces of Nigeria is Islam but an increasing number of northerners are taking to alcohol as a result of contact with the southerners.

No facilities were available for follow-up cholecystography to determine the degree of liver function regained.

#### CONCLUSIONS.

An analysis is made of 230 cases of infective hepatitis in Nigerians. The clinical picture differs in some respects from that of Europeans and six types of case can be distinguished. Cases with severe abdominal pain should be treated conservatively.

Evidence is given that catarrhal jaundice and infective hepatitis are one and the same disease.

The crowding of troops at night is considered to increase the infection-rate.

The differential diagnosis peculiar to West Africa is discussed. On clinical grounds, and from a study of morbid pathology, it may be impossible to differentiate infective hepatitis from yellow fever.

The white cell count, both total and differential, was found to be within normal limits in 83.1 per cent of patients and moderate leucocytosis occurred in the abdominal cases.

The E.S.R. was found to be slightly raised in most cases but of no value as a guide to the severity of the disease or progress.

An attempt to infect nine volunteers failed.

Convalescent serum was tried tentatively in 12 cases and it is doubtful whether any benefit resulted.

The mortality rate was higher than in European outbreaks [10, 12], namely 3 per cent. The severity of the illness is not necessarily proportionate to the degree of icterus, in fact lessening of the jaundice may presage the onset of cirrhosis of the liver.

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#### REFERENCES.

- [1] FINDLAY, G. M. and MACCALLUM, F. O. (1938). *Proc. R. Soc. Med.*, **31**, 707.
- [2] FINDLAY, G. M., and MARTIN, N. H. (1943). *Lancet*, **1**, 678.
- [3] FORD, J. C. (1943). *Ibid.*, **1**, 675.
- [4] Ministry of Health Memorandum (1943). *Ibid.*, **1**, 83.
- [5] EDWARDS, L. R. L. (1943). *Brit. Med. J.*, **1**, 474.
- [6] MACDONALD, D. R. (1943). *Ibid.*, **2**, 261.
- [7] *J. Amer. Med. Ass.* (1942). **119**, 1110.
- [8] WARING, J. (1943). *Brit. Med. J.*, **2**, 228.
- [9] DIBLE, J. H., *et al.* (1943). *Lancet*, **2**, 402.
- [10] Memoranda on Medical Diseases in Tropical and Sub-tropical Areas (1941). H.M.S.O.
- [11] HILL, J. N., and HAUSMANN, W. (1943). *Brit. Med. J.*, **2**, 263.
- [12] FINDLAY, G. M. (1943). Personal Communication.
- [13] MANSON-BAHR, P. H. (1941). "Manson's Tropical Diseases," London. P. 355.
- [14] ROGERS, L., and MEGAW, J. W. D. (1942). "Tropical Medicine," London. P. 146.
- [15] HURST, A. F. (1941). "A Textbook of the Practice of Medicine," Price, F. W. London. Pp. 693 and 698.
- [16] Leading Article (1942). *Brit. Med. J.*, **2**, 700.

## POLIOMYELITIS AND MENINGISMUS—A HUNDRED CASES.

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In a period of eight months 30 cases of poliomyelitis were admitted to a military hospital in the Middle East. In the same period 70 other cases of meningismus, none of them with an obvious primary cause, such as pneumonia, were admitted. The purpose of this paper is to present points of interest about this series of a hundred cases, to discuss the changes in the cerebrospinal fluid and to give clinical evidence that many of the cases without paresis were examples of abortive poliomyelitis.

*Source of Material and Incidence.*—All cases in the series were military personnel from the area served by the hospital.

Several cases of meningismus with discoverable primary cause were seen in the same period and were not included in the series. They included meningococcal and streptococcal meningitis; subarachnoid hæmorrhage, lobar pneumonia, typhoid fever, post-scarlatinal encephalitis, amœbic hepatitis and glandular fever. The monthly admission rate was as follows: July, 2; August, 8; September, 5; October, 19; November, 7; December, 29; January, 13; February, 20.

The last 3 cases in February are not included in the series. Because of the recent work on the spread of poliomyelitis by the alimentary system, this incidence was compared with the incidence of bacillary dysentery in the hospital. There is no relation between the two, for the incidence of bacillary dysentery reached its peak in October, with 231 cases, and fell to 64 in December and 34 cases in January. It is possible, however, that the low incidence of poliomyelitis and meningismus in July and August is due to the fact that we had not by that time become fully aware of the frequency of abortive cases, and some cases may, therefore, have escaped our notice.

*Symptoms.*—All the 100 cases complained of headache, usually frontal but occasionally occipital. It was frequently very severe, and in many cases was relieved by lumbar puncture. Half the cases complained of pain behind the eyes and pain on moving the eyes and in 8 this pain was so severe that it was difficult to persuade the patient to move the eyes to one side. Photophobia and suffusion of the eyes were common. This eye pain, said to be characteristic of sandfly fever, is non-specific and was present in 50 per cent of a series of typhoid fever and in 75 per cent of a series of infective hepatitis in the preicteric stage. Most of the patients complained of backache and aches and pains in the arms and legs. About half complained of vomiting, 25 of shivering, 14 of coryza and 7 of diarrhoea. Recurrent small hæmatemeses were a feature of one case with no evidence of peptic ulceration.

*Signs.*—(1) Meningismus. All cases had meningismus, manifested by objective neck stiffness, Kernig's sign, and/or pain in the lower dorsal or lumbar spine in full flexion of the neck. The neck stiffness in some was very slight, only detectable in the last stage of full flexion when the patient was in the sitting position. The degree of neck stiffness bore no relation to the number of cells in the spinal fluid. The Kernig sign was frequently asymmetrical in degree, but this bore no relation to the presence of normal or reduced knee-jerks. In two cases there was a slight Kernig sign on discharge but in all other cases full extension of the knee with the hip flexed to a right angle was attained before their discharge. The spinal pain on flexing the neck was found to be a valuable confirmatory sign of meningismus. Felt on slight flexion with a very stiff neck or on extreme flexion in a neck which was only slightly stiff or not stiff at all, it was variously described by the patient as "like stretching something that shouldn't be stretched," "a feeling of strain," "a pull all down the spine" or "like when the elbow is stretched too far." The pain is usually localized in the side of the

spinous processes and may be due to spasm of the erector spinæ similar to the spasm of the hamstrings seen in eliciting the Kernig sign.

The average duration of signs of meningismus was sixteen days. The average duration of fever was five days.

(2) *Other signs*.—12 were notably drowsy, 10 had nystagmus, 5 labial herpes and 5 splenomegaly. One patient had three epileptiform fits. None had sensory changes or an extensor plantar response.

A macular rash was found on the trunk in 6 cases and lasted about a week. It was fairly profuse and in three cases gave rise to a suspicion of typhus but this was subsequently excluded. It was not a sweat rash and there were no petechiæ. In 1 of these 6 there was an interesting association of bilateral extensive pleural friction without radiological change, marked meningismus and absent tendon reflexes which later returned. Another of the 6 had extensive paresis of the limbs.

The above symptoms and signs refer to the entire group of 100 cases. Henceforward the series will be split into three groups for the purpose of discussion.

#### GROUP 1.—CASES OF MENINGISMUS WITH PARESIS (30 CASES).

Seventeen of these cases had paresis on admission, while the other 13 were diagnosed in hospital in the preparalytic stage. Pain in the part to be affected was always an important premonitory sign. Pain usually preceded changes in the reflexes and these in turn usually preceded the development of paresis. In all except 6 cases the weakness developed in the first week of the illness. The following is an analysis of the type of paresis:—

Involvement of the brain-stem alone, 5.

Brain-stem involvement with altered reflexes, 6.

Brain-stem involvement with paresis of limbs, 6.

Paresis of limbs alone, 13.

Nine of these cases had involvement of muscles of respiration. Five of them died in the iron lung. One was admitted *in extremis* as a case of pneumonia, on account of tachypnoea and basal rales. He had absent knee-jerks without paresis of limbs, but his respiratory muscles were paralysed and he died before he could be put into the respirator.

Two cases were of special interest. One had complete paralysis of conjugate movements of the eyes to the right, associated with paresis of the limbs. The power of the limbs returned to normal, but the eye condition remained unchanged and knee and ankle jerks did not return. There was no diplopia.

Another patient with a slight paresis of arms, legs and respiratory muscles had a marked hypotension which was ascribed to a bulbar lesion though cranial nerves were not affected. The blood-pressure was 60/40 for two days, rose to 90/60 by the third day, 110/65 by the twelfth day and 140/80 on the fortieth day, thereafter remaining constant. On the seventh day he developed necrosis of the skin of the finger tips and toes without gangrene. The power of the arms and legs returned to normal in ten days and the tendon reflexes had become normal fifty days after the onset. He was discharged well and fit.

Delayed paresis occurred in 6 cases. In 3 of these there was a reduced or absent tendon reflex in the first week. Paresis was only detected in the corresponding muscles between the 12th and 22nd day. Another patient had weakness of the right triceps muscle on admission, and on the 20th day complained of subjective weakness of the left quadriceps and subsequently objective weakness was detected. In another, pains developed in the left calf muscles on the 18th day and paresis with loss of reflex developed on the 21st day. In another, loss of tendon reflex and weakness of the foot developed on the 31st day.

Two cases developed sciatic pain late in the disease. One was admitted with marked meningismus and asymmetry of abdominal reflexes and on the 18th day developed right sciatic pain and on the 21st day a reduced right knee-jerk. There was subsequently an inch of wasting in the right quadriceps muscle. The other developed right sciatic pain on the 9th day of the disease and the right ankle-jerk became very sluggish, but returned to normal in a week with disappearance of the sciatica.



In one case after partial recovery from a diffuse general paresis there was a relapse on the ninth day with recurrence of fever and extension of paresis which caused death.

The outcome of this group of cases is seen in Table I.

TABLE I.—THE OUTCOME OF 30 CASES WITH PARESIS.

<i>Features of case</i>	<i>No. of cases</i>	<i>Died</i>	<i>Residual paresis</i>	<i>Full recovery</i>
Complete paralysis of a limb or limbs .. .. .	7	5	2	0
Initial slight diffuse paresis .. .. .	5	0	0	5
Delayed paresis .. .. .	6	0	6	0
Involvement of brain-stem with or without paresis..	17	3	4*	10*
Involvement of respiratory muscles .. .. .	9	6	2*	1*
Summary .. .. .	30	6	12	12

\* These figures refer to the recovery of brain-stem or respiratory functions only and not to recovery of limbs.

It will be seen that in no case did a completely paralysed limb fully recover, that all cases with initial diffuse but partial paresis recovered completely and that all cases having delayed paresis had residual weakness. Of the 30 cases, 6 died, 12 made a full recovery and 12 had a more or less residual disability.

Hysterical continuance of the weakness was diagnosed in two and was treated by suggestion.

#### GROUP 2.—CASES OF MENINGISMUS WITHOUT PARESIS BUT WITH CHANGES IN TENDON REFLEXES (18 CASES).

No trivial or doubtful reflex change is included in this group. In no case was there a history of previous diphtheritic or other neuritis and in none was there sensory change. Knee-jerks were tested with the patient in the sitting position, with legs dependent over the edge of the bed, and ankle-jerks were tested with the patient kneeling, with the ankle over the edge of the bed.

The reflex affected was the knee or ankle jerk in 17 cases and the right triceps jerk in one. In only 2 cases was there involvement of only a single reflex. In 10 cases the tendon reflexes were asymmetrical. In 6 of the other 8 the tendon reflex was absent on reinforcement. In 12 cases the reflex returned to normal in an average of twelve days (extremes four and forty-two days), in 4 the reflex returned but remained sluggish and in 2 the reflex remained absent.

This group included 2 cases with extensive pleurisy. One case on admission had severe meningismus and drowsiness with absent knee and ankle jerks and a temperature of 105° F. The temperature fell to normal on the second day and thereafter remained normal. The tendon reflexes returned to normal in five days, but on the eighth day extensive pleurisy developed followed by a sterile lymphocytic pleural effusion. This cleared normally and thereafter the X-ray of the chest was normal.

The other case was admitted with meningismus, notable drowsiness, a macular rash, hypersensitive skin and photophobia. Both knee-jerks were absent. The temperature fell to normal in three days, but on the eighth day extensive bilateral pleural friction developed, with no elevation of the temperature. The blood sedimentation rate was 3 mm. per hour, the white cell count 8,600 per c.mm and the X-ray of the chest normal. The pleural friction persisted for three weeks and the knee-jerks returned. Signs of meningismus persisted for a month.

#### GROUP 3.—CASES WITH MENINGISMUS ONLY (52 CASES).

This group included 1 case with extensive dry pleurisy. He had marked meningismus and drowsiness and developed bilateral pleural friction on the seventh day without fever. The total white cell count was 11,600 at this time and the X-ray of the chest normal. The meningismus lasted for three weeks.

One case with intense headache and exceptionally severe pain on lateral movements of the eyes had three epileptiform fits. The meningismus lasted two weeks.

One patient was apparently infected in this hospital. He had been an in-patient for

infective hepatitis for a month and cases of meningismus in this series had been in adjacent beds. He developed fever and marked meningismus which lasted a month.

Of special interest is a case who was admitted in July with a high fever, severe meningismus, drowsiness and normal spinal fluid. He made a rapid recovery, meningismus lasting about five days. In November he was readmitted with exactly the same clinical picture. The white cell count was 7,400 per c.mm. and the spinal fluid contained 40 mgm. per cent protein and 160 cells per c.mm. of which 59 per cent were neutrophils. In the following March he was readmitted with the same picture, again with marked meningismus. This time the spinal fluid showed 75 mgm. per cent of protein and no cells. On none of these occasions was there paresis or alteration in the reflexes. He was well between the attacks. There was no evidence of relapsing fever, neither had he been in an area where relapsing fever was known to occur. It is known that poliomyelitis can relapse, but the varying spinal fluid response in this case is of special interest. He came from a unit in which there had been several cases of poliomyelitis.

*Cerebrospinal Fluid.*—The protein was precipitated by trichloroacetic acid and estimated by the turbidimetric method, the standards being checked at intervals.

The fluid was examined early in the disease (average third to fourth day in all cases). In 7 cases without cells in the fluid lumbar puncture was repeated three or four days later on account of severe persistent meningismus, but there were no changes of significance in the fluid.

In 46 cases there was an increase of cells (above 6 per c.mm.), in 19 increase of protein (above 50 mgm. per cent) with normal cell count and in 35 cases the fluid was normal, though in 14 of these 35 cases the protein content of the fluid was on the high side of normal—40 to 50 mgm. per cent. The glucose and chloride content was normal in all. A similar proportion of cases each month had these three types of spinal fluid. There was no relation between the degree of meningismus and the nature of the fluid. In some cases with marked meningismus the fluid was normal, while in others with only trivial meningismus there was a considerable increase of cells. Neither was there any relation between the nature of the spinal fluid and the occurrence of paresis. Paresis occurred in 30 per cent of cases with increase of cells in the fluid and exactly 30 per cent of those with a normal cell count. The cases with a normal cell count in the spinal fluid included 3 cases of diffuse general paresis, 2 of them with brain-stem involvement, of which 1 died, and 4 other cases with brain-stem involvement without paresis of limbs, but 3 of them having altered tendon reflexes.

The cases with raised protein in the fluid without increase of cells included 4 cases with generalized paresis of which 1 died.

Table II gives an analysis of the spinal fluid findings in relation to the incidence of paresis. Other details are found in Tables III and IV, and Table V gives the findings in the spinal fluid in cases of special interest.

TABLE II.—CEREBROSPINAL FLUID FINDINGS IN RELATION TO PARESIS AND REFLEX CHANGES.

	Increase of cells	Increase of protein	Normal	Total
Group 1.—Meningismus with paresis .. ..	14	7	9	30
Group 2.—Meningismus with change in reflexes..	12	1	5	18
Group 3.—Meningismus alone .. ..	20	11	21	52
Total .. ..	46	19	35	100
Deaths .. ..	4	1	1	6

TABLE III.—CELL COUNTS IN SPINAL FLUID IN 46 CASES.  
(AVERAGE PROTEIN CONTENT 75 MGm. PER CENT.)

Total cell count per c.mm.	No. of cases	Percentage of lymphocytes	No. of cases
6—10	2	1—10	3
10—25	4	11—50	15
26—100	23	51—90	18
101—750	17	91—100	10

TABLE IV.—PROTEIN CONTENT OF SPINAL FLUID IN 54 CASES WITHOUT INCREASE OF CELLS.

<i>Protein content mgm. per cent</i>	<i>Number of cases</i>
20—40	21
40—50	14
50—70	7
70—80	7
80—90	5

TABLE V.—CEREBROSPINAL FLUID AND WHITE CELL COUNTS IN CASES OF SPECIAL INTEREST

<i>Cases of meningismus Special features</i>	<i>Protein mgm. per cent</i>	<i>Cerebrospinal fluid Cells per c.mm.</i>	<i>Per. cent of lymphocytes</i>	<i>Total white count per c.mm.</i>
Macular rash, herpes simplex ..	55	157	90	7,000
Macular rash, nystagmus, reflex change, cranial nerve weakness ..	75	110	89	5,000
Macular rash alone ..	60	50	30	3,200
Macular rash, changes in reflexes ..	45	15	87	—
Macular rash, herpes simplex, splenomegaly	25	2	—	12,600
Macular rash, absent tendon reflexes, pleurisy ..	35	—	—	8,600
Pleurisy ..	50	6	20	11,600
Pleurisy, altered reflexes ..	50	20	100	16,800
Epileptiform fits ..	60	40	80	—
Paresis of limbs, paresis of conjugate movement of eyes ..	80	44	66	8,600
Diffuse paresis, marked hypotension ..	90	1	—	31,000
Sciatic pain ..	70	40	75	16,400
Sciatic pain ..	45	1	—	—
Recurrent meningismus 1st attack ..	35	—	—	—
Recurrent meningismus 2nd attack ..	40	160	41	7,400
Recurrent meningismus 3rd attack ..	75	0	—	—
<i>Group of 8 cases from One Unit in order of admission :</i>				
Changes in reflexes ..	60	300	3	6,200
Meningismus alone ..	60	50	30	3,200
Meningismus alone ..	35	40	15	5,800
Changes in reflexes ..	50	80	90	7,200
Meningismus alone ..	65	110	92	6,400
Meningismus alone ..	80	1	—	5,800
Brain-stem involvement, changes in reflexes ..	45	2	—	5,600
Meningismus alone ..	45	1	—	7,000
Fatal cases (1) ..	55	35	85	13,400
Fatal cases (2) ..	40	5	—	—
Fatal cases (3) ..	60	1	—	—
Fatal cases (4) ..	100	120	40	—
Fatal cases (5) ..	130	260	48	—
Fatal cases (6) ..	80	120	85	—
Case probably arising by cross infection in Ward ..	60	1	—	—

*White Cell Count.*—A white-cell count was made in the first six days in 59 cases. In only a few cases was there the leucocytosis said to be characteristic of the disease. In 12 cases the total count was 5,000 or less, in 38 cases 5,000 to 10,000, in 5 cases 10,000 to 15,000, in 4 cases 15,000 to 31,000. In 1 case with temporary absent reflexes the total count was 1,800. There was no relation between the white cell count and the number of cells in the spinal fluid, for in cases with no increase of cells in the spinal fluid the average total white cell count was 8,200 and in those with increase of cells 8,800. There was a slightly higher average total count (10,200) in cases with paresis than in cases without (average 7,200) but several cases of paresis had a leucopenia. The average total white count was the same (7,200) in cases with meningismus alone as in cases with meningismus with changes in reflexes but without paresis.

## DISCUSSION.

The cerebrospinal fluid findings are of interest in this series because of the frequent absence of an increase of cells.

Hamilton (1940) reported that 11 per cent of his cases of poliomyelitis had normal spinal fluid in the first day or two but that most of them had an increase of cells when the lumbar puncture was repeated.

Peabody *et al.* (1912) stated that a normal spinal fluid was common in their cases, as was a high protein content in the fluid with normal cell count. But in this series 54 per cent of the cases had no increase of cells and there was the same incidence of paresis in those with and without cell increase. The absence of the usual leucocytosis is also of interest, a leucopenia being more common in our series than frank leucocytosis. Leucopenia was as common in cases with paresis as was leucocytosis.

The position of the non-paralytic cases is of greater interest.

According to Paul *et al.* (1933), Wickham (1913) was the first to give an adequate description of abortive poliomyelitis. Paul himself described febrile symptoms, none of them with meningitic or myolitic involvement, in 175 close contacts with cases of poliomyelitis. He concluded that poliomyelitis was at least four or six times as frequent as the usual statistics indicate. He subsequently showed (Paul, 1941) that in the abortive cases the spinal fluid is usually normal.

Hamilton (1940) reported that 42 per cent of his 250 cases of poliomyelitis were non-paralytic. Draper (1939) states that 50 to 80 per cent of cases escape paralysis, and that many, therefore, go unrecognized.

In the present series there can be little doubt about the correctness of the diagnosis in the 30 cases with paresis. In none did the clinical picture correspond with that of post-diphtheritic polyneuritis. Two cases of general symmetrical proximal paralysis resembled the Guillain-Barré syndrome, but the mixed pleocytosis in the spinal fluid favoured the diagnosis of poliomyelitis.

In the 18 cases with alteration in tendon reflexes poliomyelitis is the most likely diagnosis. The criteria for the diagnosis of reflex change were rigid and no trivial or doubtful change is mentioned. In the majority there was a marked change in the reflex while the patient was under observation. Many of these reflex changes were short-lasting and could readily be missed.

It is suggested that the remaining 52 cases were probably for the most part examples of abortive poliomyelitis for the following reasons:—

(1) Cases of paresis, in which the diagnosis of poliomyelitis can hardly be doubted, occurred throughout the period, and it is therefore to be expected that abortive cases would be seen at the same time (see Table VI).

TABLE VI.—THE MONTHLY INCIDENCE OF CASES FALLING INTO GROUPS 1, 2 AND 3.

					Group 1 Cases with paresis	Group 2 Cases with reflex change only	Group 3 Cases with meningismus only	Total
July	..	..	..	..	0	1	1	2
August	..	..	..	..	6	2	0	8
September	..	..	..	..	4	0	1	5
October	..	..	..	..	5	3	11	19
November	..	..	..	..	3	3	1	7
December	..	..	..	..	8	6	15	29
January	..	..	..	..	2	0	11	13
February	..	..	..	..	2	3	15	20
Total								103

The last 3 cases in February are not included in the series.

(2) The clinical picture of the abortive cases was the same throughout the period. It might be argued that in the summer months they were cases of sandfly fever, but in the winter months the cases continued to appear with the same clinical picture when sandfly fever was non-existent. Malaria and other causes of meningismus were excluded in all cases.

(3) Benign lymphocytic meningitis might be considered as a diagnosis in cases having a lymphocytic response in the spinal fluid. But in the 12 cases in which 90 per cent or more of

the cells in the fluid were lymphocytes only 4 had meningismus without paresis or reflex change, 5 had altered reflexes and 3 had paresis.

(4) The cases in the three groups were in all ways indistinguishable except by paresis or changes in the reflexes. The nature, severity and response of the headache to lumbar puncture, the pains and suffusion of the eyes, the photophobia, shivering and drowsiness were the same in all three groups. The duration and degree of meningismus and the duration of fever were the same whether there was paresis, reflex change or meningismus alone.

(5) The spinal fluid findings were similar in all three groups. Paresis occurred in 30 per cent of the cases with increase of cells in the spinal fluid and in 30 per cent of those without (including 25 per cent of those with normal fluid). In 9 cases with paresis and 5 with altered reflexes the fluid was normal and it is therefore reasonable to expect that cases without paresis or reflex change should also have a normal fluid.

(6) The white cell counts in the three groups were similar. The average total white cell count in cases with meningismus alone was 7,200 and in cases with paresis or altered reflex 8,900.

(7) A group of 8 cases was admitted from one unit in December. 5 cases were admitted between December 9 and 12 all with an increase of cells in the spinal fluid (*see* Table V). None had paresis, but two had altered reflexes. On December 18 a sixth case was admitted, with meningismus alone, the spinal fluid having a high protein content and no increase of cells. On December 24 and 28 two other cases were admitted, both with normal spinal fluid, one with meningismus alone and the other with brain-stem involvement and altered reflexes.

Two officers were admitted from one unit within six days of each other, both with increase of cells in the spinal fluid, one with meningismus alone and the other with altered reflexes. These cases were not from large units and it seems likely that the infection in these two groups was the same.

It has not been possible to carry out laboratory tests to confirm the diagnosis by the study of the development of antibodies and other methods. But the clinical evidence suggests that many of these cases were examples of abortive poliomyelitis. It must be admitted, however, that the 3 cases with pleurisy and some of the other unusual cases may have been due to some other virus.

#### SUMMARY.

One hundred cases of meningismus (without obvious cause for the meningismus, such as pneumonia) were admitted to this hospital between July, 1943, and February, 1944. 30 cases had paresis, 18 had changes in tendon reflexes without paresis and the remaining 52 cases had meningismus alone. Clinical evidence was adduced to suggest that at least many of the cases of meningismus without paresis or reflex changes were examples of abortive poliomyelitis. It was agreed that certain unusual cases, notably 3 with pleurisy, may have been due to some other virus which can cause changes in tendon reflexes. The signs of meningismus were discussed with special reference to the lower dorsal pain on flexing the neck. The average duration of signs of meningismus was sixteen days. The series included cases of special interest—6 with macular rash; 3 with pleurisy; 2 with sciatic pain; 2 with unusual brain-stem manifestations (severe hypotension and paralysis of conjugate movement of the eyes); 1 case with a relapse and another with three attacks of meningismus at short intervals with varying changes in the spinal fluid.

Of the 30 cases with paresis, 17 had brain-stem involvement, often slight. 6 of the 30 cases died, 12 had some residual disability and the remaining 12 made a full functional recovery.

The spinal fluid was not in all cases typical of the disease. 46 cases had the usual increase in cells, 30 per cent of these having paresis. 19 cases had a high protein content with normal cell count, 37 per cent of these having paresis. 35 cases had a normal spinal fluid, 26 per cent of these having paresis.

Paresis occurred in 30 per cent of those without increase of cells in the fluid and in 30 per cent of those with increase of cells.

The white cell counts were of interest, leucopenia being common and leucocytosis unusual.

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## REFERENCES.

- DRAPER, G. (1939). In Cecil's "Textbook of Medicine," Philadelphia, 1939, p. 70.  
HAMILTON, D. G. (1940). *M.J. Australia*, **1**, 148.  
PAUL, J. R., SALINGER, R., TRASK, J. D. (1933). *Am. J. Hygiene*, **17**, 587.  
PAUL, J. R. (1941). *Medicine*, **20**, 495.  
PEABODY, F. W., DRAPER, G., DOCHEZ, A. R. Monograph of Rockefeller Institute of Medical Research, 1912. No. 4.  
WICKHAM, I. (1913). "Nervous and Mental Diseases," Monograph Series, No. 16. N. York, p. 81, quoted by Paul *et al.* (1933).

## PENETRATING WAR WOUNDS OF THE EYE AND ORBIT.

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FROM Sicily into Italy and onwards during many months, as the terrain and nature of the fighting changed, so to some extent has the type of wound and the surgical problem involved, although fairly constant throughout.

*Types of Wound.*—Military ophthalmic surgery is at present chiefly concerned with penetrating wounds due to high velocity fragment missiles resulting from high explosive action, the cause of 99 per cent of battle casualties and accidents necessitating operation by the military ophthalmic surgeon. The other odd 1 per cent of wounds are due to flying steel chips resulting from striking cold steel with a steel hammer, the commonest cause of intra-ocular foreign bodies in civil life. This type of injury is similar to a single high explosive fragment wound and presents an identical problem for investigation and treatment.

On the other hand war wounds of the eye and orbit due to high explosive action are often multiple, with additional wounds of the head, face, nose and ears, which suggests co-operative surgery by head, maxillo-facial; E.N.T. and ophthalmic surgeons. It is the rule for wounds due to explosion of shells, mortar bombs and grenades to result from iron containing magnetizable fragments. But this should not be taken for granted because it is found that accompanying the iron fragments there are often other kinds of foreign body such as gravel or fragments of stone. The novice will soon be disillusioned who lightly presumes that because one wound is caused by a magnetizable fragment a near neighbouring wound contains a similar fragment.

Aluminium grenades have caused a percentage of serious eye wounds because the fragments being radiotranslucent and non-magnetic are only sometimes removable even when they can be seen inside the eye. Alloys of aluminium as well as of other kinds of metal have also been found as penetrating fragments. These foreign bodies give a shadow in X-ray films but are non-magnetic and just as difficult to remove. Removal of such non-magnetic foreign bodies with forceps was successfully accomplished in comparatively few cases, but as the alternative is usually total loss of vision any reasonable attempt is justified.

Quite a variety of German mines have been encountered in successive stages of the campaign. At one time most of the mines were iron encased, whatever the nature otherwise of their contents, and magnetizable penetrating fragments were then the rule. At other times the H.E. agent was encased in wood or merely buried in the ground or amongst rocks, thus the resulting penetrating missiles other than iron included gravel, sand or dirt, wood, stone or lead fragments, etc., but fortunately never all together in the same case.

Another less frequent type of wound was due to a rifle or machine-gun bullet " splash " of metal fragments from the nickel casing or its lead interior, accompanied by projected splinters of iron from a vehicle, glass from a windscreen or stone from a trench parapet, all of which have been seen.

Contusion of the globe is a frequent accompaniment of penetrating fragment wounds and adds to the difficulty of diagnosis and operative treatment. The contusion injury has to be differentiated from that due to the penetrating foreign body but it should never contraindicate operation for removal of a foreign body.

Blast contusion of the globe is commonly seen as a minimal clinical entity characterized by transient lowering of vision, general injection or redness of the eye, an intact cornea and lowering of ocular tension. Recovery is to normal in a few days. But all degrees of contusion injury are common and damage may include commotio retinae, laceration of intra-ocular tissues with intra-ocular hæmorrhage, etc., culminating in extensive intra-ocular disorganiza-

tion with loss of vision and perhaps also with multiple perforating wounds, or loss of the eye from rupture of the globe.

*Routine Examination and Clean-up of Wounds.*—Whenever possible, vision should be recorded early. Examination of both eyes should be made with the pupils dilated. Penetrating wounds involving the face, eyelids, eyes and orbits require early investigation to determine the nature of the foreign bodies, their direction of travel and depth of penetration, as well as to assess the initial amount of damage and prevent loss of tissue by elimination of infection. While this investigation and clean-up of wounds is being done as many foreign bodies as possible should be removed. The earlier this is done after injury the better and easier it is. Routine trial with the magnet point is important, especially to wounds in and adjacent to the eyelids and conjunctival tissues; thus tiny iron fragments are often removed which would otherwise cause confusion with an intra-ocular foreign body in the radiograph. But, on the other hand, diagnostic trial of a known intra-ocular foreign body with the giant magnet is to be deprecated. When negative it means nothing and when positive it means additional injury has been done to an already damaged eye. Any information thus gained never justifies this risk. If for any reason operation has to be postponed, such as the more urgent need for evacuation, then the damaged eye should receive such treatment as will render the patient "fit to travel" for a period even up to forty-eight hours without the need arising for redressing the eye. Experience has shown that injured eyes travel very well if attention is given to certain treatment requirements, as follows.

(a) Meticulous clean-up of lids and adjacent skin surface, cutting of lashes, etc., and cleaning of conjunctival sac with saline or preferably proflavine 1 : 2,000 sol.

(b) Insertion of Ca penicillin-sulphathiazole powder mixture.

(c) Ung. atropine 2 per cent when necessary.

(d) Covering with either vaseline gauze and large gauze-wool pad or the latter alone firmly secured by a long bandage, 4 inch, cut in half.

*Radiological Examination.*—Whether the wound is single or multiple the objective of this examination is fourfold.

(a) To locate as precisely as possible any penetrating fragments, whether intra- or extra-ocular, orbital, etc.

(b) To determine if possible their composition by noting the relative degree of radio-opacity.

(c) To note any bony injury; fracture and displacements of bone.

(d) To note any involvement of paranasal air sinuses or intracranial penetration, which will interest the E.N.T. or head surgeon.

Routine radiological examination should be made even if the foreign body can be seen within the eye, not only because one wishes to know its radio-opacity but because another unsuspected fragment may be present and also one gains valuable information from the examination of a radiograph when one already knows where the foreign body is situated in the eye. Precise localization of an ocular or orbital foreign body being of such importance any extra trouble taken to attain this end is more than justified.

*Equatorial Ring Method of X-ray Localization.*—After long trial this method has proved its worth and is recommended as a routine.

It is necessary to have three sizes of rings which can be made, by R.E.M.E., from dental stainless steel wire, B.S.W. gauge 30, spotwelded to form rings of 24, 25 and 26 mm. internal diameter. At one spot on the ring the smallest possible bead of lead solder is applied. It will be found that a 25 mm. ring is that most generally used. Insertion of a ring into one or each eye is preferable just prior to radiological examination. A drop of cocaine solution is soothing but is unnecessary. The patient looks down and the ring is slid beneath the upper lid as far as it easily goes into the upper conjunctival fornix; the patient now looks up and the lower edge of the ring is lifted with forceps over the lower lid margin and laid in the lower fornix. The ring is inserted so that the tiny lead bead on the ring lies in sight just above the caruncle. If the patient now looks fully towards each side in turn it can be readily seen if the ring is or is not a



satisfactory equatorial fit. If too small it rides forwards on the globe and looks too small; if too large it can be seen to lie away from the globe. If replacement is necessary to give a neat equatorial fit the 24 or 26 mm. ring can be used instead. No sutures are necessary; the ring remains in place and causes negligible discomfort or damage even to an injured eye.

Removal of the ring is by a procedure in reverse order to that of insertion. The patient looks up and the ring is lifted with forceps from the lower fornix over the margin of the lower lid; the patient now looks down and the ring is lightly removed by sliding from beneath the upper lid.

Three radiographs are taken, or four if both eyes are involved. The film should be placed as near the injured eye as is possible and the X-rays should be directed through the eye rather than the orbit.

(i) A direct lateral view of the head through the eyes with the eyes looking at right angles to the direction of the rays in the same plane. The ring should appear in the film as a vertical line. This ideal is seldom attained, a narrow oval being the rule; the bead of solder on the ring identifies which is the nasal edge and indicates the direction of the rays. The position of the foreign body is noted relative to the ring which encircles the equator of the globe. If it is in the posterior wall of the globe this is usually judged accurately enough by experience without precise measurement.

(ii) An oblique lateral of one or each orbit with the respective eye turned laterally so as to be at right angles to the direction of the rays. It will be noted that the eye moves twice as much as the ring, which only tilts or turns half-way, and this must be allowed for when viewing the film. The ring shadow is again usually oval. This film is supplementary or rather confirmatory to the direct lateral view.

(iii) A direct postero-anterior view with the head tilted only sufficient to throw the petrous shadow below the lower orbital margin, eyes looking in the same direction and plane as the rays are directed. It is not really necessary but each orbit can be filmed separately for greater accuracy. The ring appears as a circle and any ocular foreign body shadow must be inside it.

It is useful to compare the relative density of the foreign body shadow with that of the ring and its lead bead. It is an indicator of the nature of the foreign body, e.g. lead fragments resemble the denser shadow of the bead, iron may resemble the steel ring depending on the thickness of the foreign body, whereas stone and wood foreign bodies are definitely of lower radio-opacity.

Bakelite and aluminium are radiotranslucent whereas glass may give a shadow depending on its composition.

It may be objected that the ring is not strictly equatorial in all positions of the eye because it does not move equally with the eyeball; it only tilts half-way in the direction the eye is turned. This is admitted but it does not alter the fact that operations planned on this radiographic evidence have been consistently satisfactory and confirm one's faith in the employment of the ring method.

As would be expected, extra-ocular and orbital foreign bodies are of more frequent occurrence than intra-ocular, but this radiological method accurately localizes either relative to the eyeball.

*Operative Treatment.*—Without undue delay one should proceed to operation because there is urgency if not emergency.

*Extra-ocular and orbital* foreign bodies are removable from almost any location behind the globe if their size or position indicates that removal is preferable to leaving them where they are. Orbital depths may be reached by incision through the base of either lid keeping to one or other side of either the superior oblique tendon or the inferior oblique muscle. To avoid injuring ocular muscle nerves exploration should proceed from outside the cone of muscles. Use of the magnet point may be a help in final identification of iron foreign bodies hidden in muscle or orbital fatty tissues.

*Intra-ocular* foreign bodies irrespective of their composition must first be localized within the globe. The metal fragment may be seen by the ophthalmoscope, and usually the earlier

the eye is examined after injury the greater is this possibility ; or its site may have to be judged by deduction from clinical and radiological evidence. Few ophthalmic surgeons have a giant magnet at their disposal but most in this theatre of war have a small " hand " electro-magnet. Possession of a giant magnet permits either of two alternative operative methods, therefore the surgeon's choice of procedure may be limited by lack of it.

*Removal per Anterior Route.*—By the action of the giant magnet the foreign body is drawn forwards either through a previously damaged lens or around and between an intact lens and fully dilated iris into the anterior chamber from which it is then removed either through the corneal wound of entry or through a fresh keratome section of the cornea. To permit of this manœuvre without damaging an intact lens or iris a well-filled anterior chamber is essential and the use of a hand electro-magnet advisable.

As a magnetizable foreign body always comes out obligingly with its long axis to the magnet point only very slight enlargement of the entry wound may be necessary.

*Removable per Posterior Route.*—This method is perhaps most often employed and is to be recommended because it permits (a) the use of the small electro-magnet, (b) the nearest and most effective approach of the magnet point to the foreign body and therefore the shortest and most direct line for its removal.

The one objection is that this method requires making an incision through the retina unless extraction of the foreign body is accomplished through the scleral entry wound.

(i) If the foreign body is judged to be more or less free inside the globe, i.e. not firmly embedded in the scleral wall of the eye, it is advisable to make the posterior sclerotomy opening in the nearest radius by a stab incision of 3 mm., made with the point of a Graefe knife vertically inserted through the whole wall of the globe into the vitreous, inserting the knife point at approximately 7 to 8 mm. posterior to the limbus and cutting forwards 3 mm. towards it. This procedure has not, as might be thought, been followed by intra-ocular hæmorrhage. The conical magnet point is inserted about 2 mm. into the opening to withdraw the foreign body.

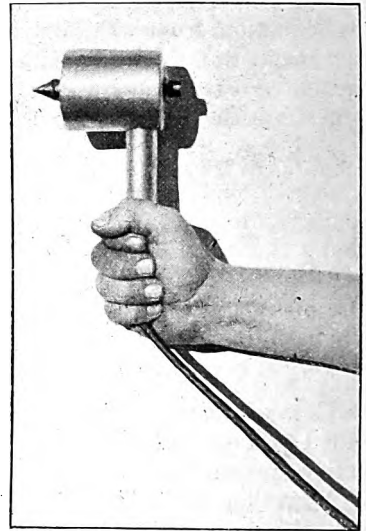
(ii) If the foreign body is seen or thought to be more or less firmly fixed in the posterior wall of the globe it is preferable to make a similar 3 mm. stab incision as near as possible to the foreign body and in a line parallel to but avoiding the larger retinal blood-vessels likely to be damaged. Posterior stab sclerotomies of this type have been observed during the healing process up to eight weeks after operation and no sign of retinal detachment was then seen, but if a diathermy machine is available it is advisable to diathermy lightly the involved area of scleral surface before making the incision to minimize the possibility of retinal detachment.

The small electro-magnet used with success in this theatre of war is a composite gadget made from spare parts by R.E.M.E. at the request of the Adviser in Ophthalmology, Lieut.-Colonel B. W. Rycroft, under the directive eye of Captain Edward Livingstone, R.A.M.C. It is small, the size of a 50 cigarette tin cylinder, composed of a solenoid coil of approximately 1 ohm resistance around a soft steel core, with conical or alternative screw-on points, and combined end button switch. It is activated by a 12 volt battery giving 12 amperes current which creates a four pound pull on the end of the magnet core.

No attempt is made to use statistics and the following quoted figures are merely interesting. During the last six months battle and accident casualties have been personally dealt with to the number of roughly 600 cases ; of these, approximately 300 were probable cases of intra-ocular foreign body and had radiological examination resulting in 50 per cent negative and 50 per cent positive films. Of these latter 150 cases only 50 had successful operations for removal of the intra-ocular foreign body. Many eyes were lost for a variety of reasons, infection being negligible. Perhaps the commonest reason was that the particular eye was too badly damaged to survive without undue risk ; another reason being that the foreign bodies were non-magnetic. Included were two cases of siderosis with loss of vision, each resulting from several months' retention of an iron foreign body, removed in each case.



Initial model.



Subsequent model.

The Livingstone-Mansfield intra-ocular hand electro-magnet.

There was no evidence of sympathetic ophthalmia in either of these cases, nor has it been seen in any others.

In conclusion, the purpose of this paper is (i) to recommend the equatorial ring method for radiological investigation and localization of all orbital and ocular foreign bodies ; (ii) to plead for the more confident use of the smaller " hand " electro-magnet which if properly designed may with advantage replace the giant magnet ; (iii) to convey some impressions resulting from recent activity in a busy centre of ophthalmic war surgery.

## A YEAR OF ARMY MEDICINE IN CHINA.

By Captain J. K. HAMPSHIRE,  
*Royal Army Medical Corps.*

[Received March 12, 1945.]

FOR the past year I have had the privilege of working in close collaboration with Medical Officers of the Chinese Army Medical Administration. This has been a great experience, as it has shown me Western Medicine in a new light, and has also given me an insight into conditions in the Chinese Army.

The exact nature of my appointment cannot be disclosed, but most of my work with the Chinese Army has been done in a small Regimental Hospital and the remainder with the units themselves.

Here are my observations and impressions.

Firstly, there is a great shortage of fully trained Chinese doctors, many of the Medical Officers have only had eighteen months regular training and some only six months. Secondly, one rarely sees a fully trained nurse. I have seen only one and she was working for the Chinese Red Cross. Possibly there are more in the Base Hospitals which I have not had an opportunity of visiting. Thirdly, there is a tremendous shortage of even essential drugs—quinine, atabrin, sulphanilamide, aspirin and sulphur ointment—of surgical dressings and of hospital equipment. Fourthly, practically all transport of wounded, even over long distances is by stretcher bearer, so that the transport of wounded from the front to the first Hospital where surgical attention is available may easily take a week or more. There are other important questions such as nutrition, hygiene and sanitation which I cannot deal with at present.

I will now give a list of what, in my experience, have been the commonest conditions seen, in order of frequency, and will give a short description of the treatment we have been using.

Common diseases in order of frequency:—

Skin diseases (including tropical ulcers).

Intestinal parasites.

Malaria and its sequelæ.

Bacillary dysentery.

Eye diseases.

Nutritional diseases (a) primary ; (b) secondary to malaria and dysentery.

Relapsing fever.

Pneumonia, lobar.

Cerebrospinal meningitis.

Plague.

Tuberculosis, pulmonary.

Typhoid and typhus fevers.

Surgical conditions.

The above list covers the majority of the diseases I have seen. It will be noted that acquired venereal disease does not figure on the list. One sees very few such among soldiers, though the condition is not uncommon among civilians and officers.

I will now give an outline of the treatment which has been adopted for these various diseases, sometimes as it seemed the most successful, at others as it was the only one available in view of inadequate supply and the small range of drugs available.

SKIN DISEASES.—Of these, scabies is by far the commonest, both in the simple and secondarily infected form. Not only is this condition universally present but it is also generally a

very longstanding infection. I must admit that, owing to lack of bathing and disinfection facilities and inadequate supplies of sulphur ointment, or an adequate substitute, we have not been able to deal with this problem except in the cases of guards who came directly under our own care, and other small bodies of soldiers. Even here supplies of sulphur ointment have been insufficient and we have had to make sulphur soap (10 per cent) from local materials. Using this sulphur soap and hot water to wash with, though far from satisfactory, is all we have been able to do for this condition. For infected cases we prescribe 1.5 grams of sulphanilamide daily for two or three days which relieves the discomfort of the secondary infection, even with this minute dosage.

The only other common skin disease is boils, which have been treated mostly with hypertonic sodium sulphate dressings. One important and fairly large group of patients, namely those with tropical ulcers, I have included under skin diseases. These are almost all confined to the region round the ankle and the lower third of the leg. They are seen mostly in soldiers debilitated by malaria and dysentery, and sometimes extend with alarming rapidity. This condition is well known to be very resistant to treatment. The following I have found to be the most successful method: rest with the leg elevated, while cleaning up the ulcer with daily dressings of anhydrous sodium sulphate. When the ulcer is clean we dress it with a sterilized bandage impregnated with vaseline which encircles the leg and ulcer in one turn, outside this we put an acriflavine dressing over the ulcer. The acriflavine dressing is changed daily but the vaseline bandage not oftener than every five days to avoid disturbing the granulations. This method, introduced by one of my colleagues, Captain J. Webb, seems to work better than any other we have tried. If the above treatment does not succeed an intravenous injection of neocarsphenamine often improves the condition even if there is no specific basis. We have not used plaster of Paris, partly owing to shortage of supply and partly because of one very bad result following this treatment.

**INTESTINAL PARASITES.**—Round worm infection is very common. Almost everyone who lives any time in the country becomes infected. We have treated a few cases with santonin, where these parasites were causing unpleasant symptoms, but shortage of santonin has precluded any attempts at mass treatment.

**MALARIA.**—This disease is extremely common, especially as the soldiers are not equipped with mosquito nets nor with anti-malarial clothing. Both M.T. and B.T. forms are commonly found, but M.T. infection predominates in certain localities. A few cases of quartan malaria have been diagnosed microscopically.

*Treatment.*—Supplies of quinine available have been quite inadequate to treat all cases, and Captain J. Webb introduced the following method to meet this situation. Tablets of quinine HCl. [*sic*] are dissolved in distilled water, making a solution of  $7\frac{1}{2}$  grains in 10 c.c. The solution is filtered and sterilized by boiling and 6 c.c. to 8 c.c. is given intravenously, depending on the patient's weight and condition. In over a thousand injections there have been very few reactions. In 200 cases injected in our own M.I. room there were no serious reactions. One Chinese Medical Officer, whom we supplied with this solution, sent in a report on 114 cases treated with this solution during the past three weeks. 87 cases became free of symptoms after one injection, 25 after two injections, and the remaining 2 after three injections. Naturally the recurrence rate among these 114 cases will be high, but recurrences occur with all forms of malaria treatment, and our only claim is that we would have used at least 500 tablets to produce similar results with oral administration, against 172 used by intravenous injection. Where supplies of quinine are inadequate this is an all-important consideration. I have not seen a single case of blackwater fever. Mepacrine HCl. [*sic*] 0.1 gram t.i.d. gives better results in M.T. infections than quinine administered by the oral route.

*Sequelæ of Malaria.*—Severe anæmia is the most frequent, especially in M.T. infections. Ferrous sulphate and ferri et ammon. cit. have been used in its treatment. Oedema of legs is also not uncommon.

**BACILLARY DYSENTERY**.—One sees a very large number of these cases especially in the autumn months. Some cases have become chronic before they come for treatment. The great majority however clear up with sulphapyridine 3 grams per diem for two days. One of my colleagues states that the majority will clear up on half of this very small dose. Stools are examined by the naked eye and microscopically and the patient by proctoscopy. The proctoscope is one of the most useful instruments we have. Sulphathiazole probably gives almost as good results as sulphapyridine in similar doses. I have not tried sulphanilamide nor sulphadiazine. My colleague considers that sulphapyridine on the whole gives the best results. Castor oil and sodium sulphate are often prescribed before we use our precious supplies of sulphapyridine, but the results with these drugs are very disappointing. Chronic bacillary dysentery and chronic malaria with severe anaemia are the forerunners of oedema of the legs mentioned below under Nutritional Diseases. The oedema is often already present when we first see the cases.

**EYE DISEASES**.—Trachoma is much the commonest and is probably largely spread by the Chinese custom of wiping the face with a hot towel after meals. We treat it along the usual lines. Sulphanilamide has been tried in a few cases but only in very small doses. Conjunctivitis, corneal ulcers and entropion are not uncommon. A few soldiers complain of not being able to see clearly in the dark. They generally improve on cod-liver oil. I have not seen any cases of xerophthalmia.

**NUTRITIONAL DISEASES**.—I have classified these roughly as primary and secondary, the primary cases being those where there is no obvious cause, the secondary those following dysentery and malaria, especially where these conditions are chronic. The secondary cases are much the larger group. The presenting features are oedema of the legs and in the severe cases ascites. Later, if untreated, the oedema becomes generalized. There is generally no albumin or casts in the urine, nor any obvious heart lesion. The majority are not cases of beri-beri, though I have seen and treated a few cases of this condition, thanks to a generous gift of Benerva from the manufacturers, nor are they due to nephritis nor hookworm. A few cases may be due to gross anaemia following malaria but the majority, following chronic dysentery, I would diagnose as famine oedema due to low plasma protein content. A large proportion of these cases die, especially if they have already developed ascites. The only means of treatment is to give them bean curd and eggs to increase the protein intake. Other easily assimilated proteins are not available and the digestive function is always seriously impaired. Plasma has not so far been available.

**RELAPSING FEVER**.—In April of 1944 we had to deal with an epidemic of this disease. I saw about 500 cases in all, but was not able to treat all of these owing to lack of neoarsphenamine during one period of the epidemic. The diagnosis was complicated by cases of cerebrospinal meningitis and pneumonia both of which were prevalent at the time. Fever, a very rapid pulse, aches and pains in the bones and nose bleeding, often severe, were the common features. Epigastric pain was also a fairly common symptom. The cases were treated with neoarsphenamine, 0.3 gram intravenously, or a similar dose of sulpharsphenamine intramuscularly. With intravenous treatment there was generally a response to this small dose in 24 hours, and in the intramuscular injection cases within 48 hours. The intramuscular sulpharsphenamine is probably safer for cases who are very seriously ill. The mortality was considerable and the morbidity rate, after the fever had subsided, very high. Here again a larger dose would have been used had the supplies been sufficient for the need.

**LOBAR PNEUMONIA**.—These cases are generally seen in winter and have been treated with 4 grams of sulphapyridine a day for 2 days by which time they generally show a good response to treatment.

**CEREBROSPINAL MENINGITIS**.—This condition often assumes epidemic proportions among the civil population of China, especially in Spring. The cases we treated, if not moribund when first seen, responded well to doses of sulphanilamide or sulphapyridine not larger than those mentioned above for pneumonia. Occasionally larger doses were needed as in one case I remember where hypopyon was present as a complication. Two patients who were uncon-

scious when first seen, and could not be treated orally, recovered after sulphapyridine suspended in water had been administered through a nasal catheter. The soluble product for injection was not at that time available.

**PLAGUE.**—This condition has appeared in epidemic form among the civilian population in the area and a few Army personnel were infected. The majority of the soldiers have been inoculated against plague which probably explains the low incidence. We were fortunate in having fairly adequate supplies of sulphathiazole which is usually effective. 7 grams were given on the first day followed by 6 grams each succeeding day till the temperature fell. This period was usually three to four days. Fortunately no case of pneumonic plague was seen. Dr. Pollitzer, of the anti-epidemic service of the Chinese National Health Service, advised me to take sulphathiazole prophylactically if attending a case of pneumonic plague.

**TYPHOID AND TYPHUS FEVERS.**—Typhoid fever is fairly common, but I have yet to see a case which I could diagnose with confidence as typhus fever, which is interesting in view of the prevalence of relapsing fever. I am told that the Chinese have a much higher resistance to typhus fever than Westerners. Many missionaries have died of typhus fever, in North China especially, and the mortality among them is definitely higher than among the Chinese. The Chinese also seem to have higher resistance to septic infections. The majority of the Chinese troops have been inoculated annually against typhoid fever.

**SURGICAL CONDITIONS.**—These fortunately are few and far between as facilities for treatment are very meagre. I have only seen three cases of hernia and only one case of "acute abdomen," and this was probably a case of perforated typhoid ulcer.

The number of wounded soldiers one sees is very small compared with the large number of medical cases. The Chinese units I have worked with have an adequate supply of minor surgical equipment but the supply of dressings is quite inadequate.

**LANGUAGE PROBLEMS.**—I am assisted in my work by an English speaking Chinese Medical Assistant, who interprets the patients' complaints to me. Quite often one has to deal with recruits who speak only a local dialect, and one has to work through two interpreters. This double interpretation makes the obtaining of an accurate history a difficult and tedious process, but this and other difficulties are all part of the day's work in China.

## THE ROD AND THE SERPENT AND OTHER BADGES.

By Colonel R. I. POSTON, *T.D.*, *M.D.*

[Received March 2, 1945.]

"What! know ye not . . . . you ought not to walk upon a labouring day without the sign of your profession."—*Julius Cæsar*, Act I, Sc. I.

THE British Army is not only unique in its badges amongst the armies of the world but it is also the only one of our Services where such badges are worn by personnel. It is true that during, and since, the last war the Royal Navy adopted certain heraldic devices for the quarter-deck and the tampons of guns, and that the Royal Air Force has now got a series of emblems for many of its squadrons, but neither the sailor nor the airman wears them on his uniform. A brief study of the varied signs of the professions in the Army is therefore not only of interest but historically instructive.

Few people realize that the "pip" or star of rank is a replica of the Star of the Order of the Bath. Officers of the Brigade of Guards do not wear this as the Coldstreams, the Grenadiers and the Welsh Guards wear the Garter Star, the Scots Guards wear that of the Thistle and the Irish Guards the Star of the Order of St. Patrick. As part of the regimental badge the Garter Star is incorporated in those of the Coldstream, the King's Dragoon Guards and the Royal Sussex Regiment. The Scots Guards wear the Star of the Thistle as do the First of Foot (the Royal Scots) and the Black Watch. Besides the Irish Guards, the 4th Royal Irish Dragoon Guards wear the Patrick Star.

The feathers of the Prince of Wales are worn by at least ten different regiments of cavalry and foot. Royal cyphers are common, that of the reigning monarch being worn by the Royal Engineers, the Royal Army Service Corps and the Corps of Military Police. The coronet and cypher of the Duke of Cambridge form part of the badge of the Middlesex Regiment; those of the Duke of Edinburgh are worn by the Wiltshire Regiment and the heraldic device of a former Duke of York in the same way by the Seaforth Highlanders. The Prince Consort's memory is preserved in the badges of the 11th Hussars and the Somerset Light Infantry, and Queen Charlotte is remembered in the crest of the 16th/5th Lancers. It is wondered if the oppressed people of Denmark know that their royal daughter who became our Queen Alexandra has a permanent memorial in our Army. The Daneborg or Cross of the Royal Arms of Denmark forms the crest of the 19th Royal Hussars, the Green Howards and the Queen Alexandra's Imperial Military Nursing Service. The Territorial Army Nursing Service also wear her initial in a doubly intertwined "A."

One of the commonest emblems in the Army is the grenade. Worn by the Grenadier Guards, the gunners, the sappers and all fusilier regiments, it varies greatly in the shape of the flame, the number of tongues of flame and the emblazonment on the grenade itself; for example, the flame from the sapper's grenade has three extra small tongues compared with that of the gunners. The Fighting Fifth (the R.N.F.) have the George and Dragon on the grenade and the XX Foot (the Lancashire Fusiliers) show the sphinx. The sphinx of Egypt has its place in the badges of at least twelve regiments including the Gloucesters who also wear a miniature on the back of the cap to commemorate the great occasion in Egypt when they fought and defied the enemy when attacked from both front and rear.

Castles are frequently seen in badges. The Castle and Key of Gibraltar is worn by several regiments. The Devons wear the Castle of Exeter, the King's Own Scottish Borderers that of Edinburgh and the Inniskilling regiments, horse and foot, wear that of Enniskillen. The French eagle is an interesting device adopted during the Napoleonic wars and four regiments, two cavalry and two infantry, wear it to commemorate the capture of the Eagles or standard of the French infantry at Waterloo, Salamanca and, in the case of the Royal Irish Fusiliers, at Barossa in 1811.



The Chinese dragon is worn by several regiments for service in the Chinese wars and the Royal Tiger of India and the Elephant for campaigns in India. The Staffordshire knot is worn by both the Staffordshire regiments. The knot must not be confused with the coil of rope awarded as a badge to the Royal Berkshires for their services as marines at Copenhagen. The acorn was awarded to the Cheshire Regiment after Dettingen as a token of loyalty. The white and red roses of York and Lancaster are well represented in the respective county regiments but it is not so well known that the Hampshire Regiment wears the red rose in commemoration of the fact that Henry V conferred it upon the town of Winchester on his way to Agincourt in 1415.

The badge of the Royal Army Medical Corps is officially described as—

“Within a Laurel Wreath surmounted with Crown, the rod of Aesculapius with a Serpent entwined.”

The origin of the story of the rod and the serpent is lost in mythology and Bible story. In the Bible we find in Exodus how, at the Divine command, Moses threw down his rod and it became a serpent and when Pharaoh's magicians and sorcerers accomplished the same feat Aaron's serpent proceeded to swallow them all up one by one. It is not recorded if Pharaoh's people got their rods back. Later we read in Numbers that, in the wilderness, Moses made a serpent of brass, put it on a rod and raised it so that all who were bitten by serpents could look on it and live. This seems to be the first recorded association of the symbol of the rod and the serpent with healing, and to the reputation of this great leader as the first great quartermaster should be added also that of the first great medical officer in charge of troops. There is a theory that this demonstration was a practical one to show the children of Israel how to get rid of subcutaneous guinea-worm. The brazen serpent remained for a long time the Israelitish sign of healing and it became so honoured and revered that it led to idolatry and Hezekiah destroyed it. One point before the story of the brazen serpent is left is worthy of note and that is that the dress badge of the Corps is a *silver* serpent on a golden rod.

From the Bible story we next turn to mythology and legend and there find the association of the serpent and the rod on the one hand and healing on the other more complex. Aesculapius, to whom the symbol is usually attributed, was the Greek god of medicine, the son of the healing god Apollo, and it is said that in his youth the centaur Chiron instructed him in the cure of all diseases. Chiron will be referred to below. The skill of Aesculapius (he was physician to the Argonauts) was so great that he was reputed to be able to bring the dead back to life. For this Jove struck him with his thunderbolts. He was later worshipped as the god of healing and adopted by the Romans as such during the plague of 293 B.C. It is even said that he was brought to Rome in the form of a snake. The snake was considered by the Romans as a symbol of rejuvenescence and of prophecy; and snakes were invariably kept in the temple of their new god of healing. The whole affair became a family matter and with him were worshipped his wife Epione, the soother, their son Telephorus, the god of recovery, and their daughter, Hygeia. He was a favourite subject for contemporary artists and is usually represented as a nice mild-looking man with a beard—in fact, not unlike the Victorian and Edwardian practitioners remembered by some of us with the differences that the frock-coat and silk hat are absent. Instead of signs of his profession such as a stethoscope or a surgical haversack, he is usually depicted holding or leaning on a rod or a staff with a serpent coiled round it or near his feet. Hygeia, his daughter, who of course gave her name to the science, is usually depicted as a pleasant maiden with a serpent draped over her shoulder and feeding from a cup. The Romans called her Sallus, a name from which we have obviously derived our adjectives “salutory” and the less stern “salubrious.”

The next mythological giant who attracts our attention in connexion with this theme is the Greek god Hermes who is so closely identified with the Roman god, Mercury, that they are probably one and the same. Hermes was an extraordinary deity who is said to have committed thefts and discovered music on the day he was born. He was also the god of roads, the protector of heroes, tradespeople and thieves. As Mercury he was the Messenger of the Gods

and the Royal Corps of Signals was quick and right to adopt him as the centrepiece of their badge. If this badge is examined we find that he is carrying a peculiar staff known as the Caduceus. This was, mythologically and originally, a branch or rod with two shoots which were intertwined as to form a knot at the top. These minor shoots were later represented as serpents and wings were added later to the top of the main shoot. In this way the concept has become the heraldic representation of the herald, the messenger and speed. The Caduceus was, however, originally the wand of the enchanter and an emblem of influence over both the living and the dead, and as an emblem of healing it has survived to this day in two interesting ways. The French Army still calls their pharmacists *Caduciens* and the Royal Air Force Medical Service wear the Caduceus as their professional badge on the collar.

It is interesting to note that a simple rod and serpent is worn by the medical services of the German Army, Navy and Luftwaffe.<sup>1</sup>

Bacchus, the god of many things, carried a rod wreathed with serpents, the Thyrsus, with which he is said to have wrought miracles. Chiron, mentioned above, is represented in the badge of the Royal Army Veterinary Corps. He was keeper of the famous classical stables and teacher of Jason, Achilles and Aesculapius, as well as being represented in the Zodiac as the Archer. We touch on a delicate point here because if the R.A.V.C. Chiron taught the R.A.M.C. Aesculapius we are a junior corps, unless we turn to the fact that the first association of our device with healing was the incident in the wilderness.

Many other classical illusions to serpents exist. Eurydice the wife of Orpheus died from a serpent's sting and Harmonica, the daughter of Venus, was turned into a snake after her death. The three hideous maidens, the Gorgons, had heads covered with snakes instead of hair—the Caput Medusæ. The Babylonians had a serpent goddess of health and the Druids are said to have had a god of medicine named Lug whose symbol was a snake. He was also the god of the arts and poetry.

The next medical badge has an origin of great historical interest—the Red Cross—the accepted symbol of aid and help to the sick and wounded. In 1099, the year of the Capture of Jerusalem, the Order of St. John of Jerusalem was founded. The Knights of that Order were noblemen of many countries, fighting in the Crusades. As well as being soldiers they had developed a considerable concern at the amount of distress and sickness that followed in the wake of war and there grew the prime idea that, as soldiers, they should not only fight but bring succour to the oppressed and distressed. As the badge of their new order they adopted the white eight-pointed Cross of St. John on a red background and wore it on a black mantle. Draughtsmanship was not good in those days and the cross became more and more square, the points disappearing as in the Maltese Cross. It was gradually incorporated into the arms of ruling houses as a plain white cross on a red ground, notably in the house of Savoy and in various houses in Helvetia before their confederation became the State of Switzerland. This emblem was adopted by this State. In 1864 the capital was the scene of the signing of the Geneva Convention by the leading European powers, guaranteeing the neutrality of ambulances, hospitals, medical and sanitary officers, nurses, chaplains and others engaged in the care of the sick and wounded. A sign or an emblem was needed. A Frenchman, I believe, had the inspired idea of reversing the arms of the city and State where this epoch-making agreement had been arrived at. As a badge why not reverse the white cross on the red ground to the red cross on a white ground? Thus was created the simple and well known symbol which requires no further explanation.

From this brief survey it can be asserted that whilst carrying no standards or colours emblazoned with battle honours the Army Medical Services wear signs of their profession which in traditional and historical association are second to none.

<sup>1</sup> The linstock or slow match used by the gunners of the 17th century to fire the guns often took the form of the rod and the serpent, the inflammable material being wound round an iron rod and the lit end passing out from the serpent's mouth. This instrument was placed between the guns and kept burning

## INTERSTITIAL EMPHYSEMA OF THE FACE AND PARONYCHIA AS SELF-INFLICTED INJURIES.

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[Received January 17, 1945.]

SELF-INFLICTED injuries are rare in the British Army. The handling of patients suffering from such injuries frequently devolves on the psychiatrist and it is not intended here to discuss his principles of treatment. The establishment of the diagnosis, however, will usually rest with the surgeon, physician, or regimental medical officer, and the essential nature of the lesion is liable to be overlooked unless one "knows the trick," or unless the condition reaches epidemic incidence as occurred in the case of self-inflicted conjunctivitis. The present paper records two types of self-inflicted injury to which no reference has been found in the surgical literature of the present war—interstitial emphysema of the face and paronychia.

### INTERSTITIAL EMPHYSEMA OF THE FACE.

*Case 1.*—Private A., a Cypriot, was admitted to this hospital on July 10, 1943, from his unit where he had been sentenced to undergo "detention." He complained of pain and swelling in the left parotid area. His temperature was 100° F., but settled to normal within forty-eight hours. Crepitus, presently noted in the left infra-orbital area, led to critical dental and radiological examination. No dental sinus or fracture could be demonstrated and the patient did not complain of any injury. The only additional abnormality recorded was a small recent scar in the left upper gingivo-labial sulcus opposite the second molar tooth. The swelling of the face subsided completely and, despite a variety of unsubstantial complaints of abdominal pain, he was committed to the Field Punishment Centre to commence his detention. A note was added to his documents that the lesion of his face had probably been self-inflicted. Two days later he was re-admitted to hospital with well-marked emphysema of both cheeks and of the upper neck. A fresh abrasion of the buccal mucosa was present at the previous site. He offered no explanation of the emphysema, maintaining simply that it developed when he was asleep. He denied all knowledge of the abrasions. The condition again spread to involve the infra-orbital tissues but resolution was almost complete when he was again discharged to detention.

*Case 2.*—Private C. was admitted from the same Company on July 12, 1943, on account of a tender crepitant swelling of the right cheek. No dental or buccal lesion was noted. X-ray examination was partially invalidated by an obscurity of the right antrum. This obscurity was not inconsistent with hæmorrhage and, had any history of injury been proffered, it would have been desirable to confirm its nature as possibly indicative of fracture. Injury was, however, again denied. Uninterrupted resolution occurred and he was told on July 30 that he would be discharged to his unit on the following day. On the morning of July 31, before he was due to leave hospital, he presented well-marked bilateral emphysema of the cheeks. A minute wound was found in the right upper gingivo-labial sulcus covered by a pin-head clot of blood. On the same morning the "pricker" of a Primus stove, missing from the ward kitchen, had been found by the patient's bedside. He was committed to the Field Punishment Centre on conviction of wilfully injuring himself.

*Motive.*—The two patients were reported by their Company Commander to be unsatisfactory soldiers and to be inseparable companions. The motive in Case 1 is clear in that he was about to undergo a sentence of detention and any portion of the sentence which he could spend in hospital would count toward its completion. In Case 2 two possibilities arise. He may simply have wished to avoid duty, preferring the relatively leisured comfort of the hospital patient, or he may have injured himself in order to be with his friend.

*Mechanism.*—The production of interstitial emphysema depends upon gaseous pressure and the relative resistance of the bounding membrane. Variation in both factors can usually be noted in the individual case. Thus, in the familiar emphysema of the chest wall or mediastinum the necessary increase in pressure is provided by coughing or other strain, while a point of lowered resistance is produced by a fractured rib injuring the lung, or by a pulmonary emphysematous bulla.

Emphysema of the face is rare except as a result of spread from the neck. The commonest primary site in the face is probably the orbit. The resistance here is lowered by a fracture of the orbital wall, usually of the lamina papyracea of the ethmoid, while the increased pressure is provided by sneezing or nose-blowing (Linhart, 1943). It is held that the present lesions were produced by deliberate wounding of the buccal mucosa followed by a wilful increase of air-pressure within the mouth. The observed wounds varied in size from one-quarter of an inch in length down to that produced by the introduction of a fine wire in the form of a Primus "pricker." No direct evidence exists as to the means by which the buccal pressure was raised, but it is considered that adequate pressure could be reached by forceful expiration against the closed lips and nares. Unfortunately neither patient could be persuaded to admit that the lesion was self-inflicted or, after sentence, to demonstrate its production.

It is difficult to appreciate how either of these soldiers of low intelligence came to devise such a mechanism. The area chosen for wounding, the gingivo-labial sulcus, is probably one of the most favourable within the mouth. Though dental surgeons are familiar with the occasional occurrence of emphysema of the face following tearing of the gum in dental extractions, a small wound there, or on the lateral surface of the cheek, is not likely to provide an adequate point of lowered resistance for the entry of air. In the former site the mucosa is supported by the bony alveolus; in the latter the overlying fascia is rendered taut and supports the mucosa when the cheeks are inflated.

*Clinical Progress.*—In the cases described the initial swelling became diffused and absorbed without incident in about fourteen days. Pain was never severe and appeared to be rapidly relieved. The introduction of air into the tissues through a septic cavity was not followed by cellulitis or other evidence of infection. This is, however, less surprising than the uneventful recovery of the patient described by Brown and Fine (1941) in whom very extensive interstitial emphysema of the back had been produced by the penetration of the rectal wall by the nozzle of a Higginson's syringe through which air was being injected in the course of a radiological investigation.

#### PARONYCHIA.

*Case 3.*—L.A.C. L., aged 22, was treated in his unit with applications of silver nitrate to a wart on his right ring finger. On August 12, 1943, he was admitted to this Hospital where the nail was removed and the wart excised. He was about to be discharged to his unit when, on August 25, he developed paronychia in the right middle finger. The nail was removed. In the succeeding week inflammation developed in the nail-fold of the right thumb and index finger. At this stage a minute foreign body was noted among the granulations on the nail-bed of the middle finger. This proved to be a small piece of wire and there were presently removed from under the nail-folds of the thumb five such pieces, of the index one piece, and of the middle finger seven pieces. The wires varied in length from 2 mm. to 6 mm. and their uniform colour, calibre, and undulating shape left no doubt that they were broken-off ends of wire from the fly-swats issued to patients. Recovery was uninterrupted.

There is little doubt that the motive in this case was to avoid an unwelcome posting. The condition presented no unusual pathological features. Again the patient denied that the lesion was self-inflicted. Had this man not left the wires *in situ* the difficulty in establishing the self-inflicted character of the lesions would have been considerable.

#### SUMMARY.

Two rare types of self-inflicted injury are described; two cases of interstitial emphysema of the face, and one case of self-inflicted paronychia.

In the former condition the air was apparently introduced by deliberate wounding of the buccal mucosa followed by inflation of the cheeks.

I am indebted to Colonel J. Biggam, M.C., Commanding Officer of this Hospital, for permission to forward these cases.

#### REFERENCES.

- BROWN, S., and FINE, A. (1941), *Radiology*, **37**, 228.  
 LINHART, W. O. (1943) *Jour. Amer. Med. Assoc.*, **123**, 89.

## EFFORT SYNDROME AT AN ARMY PHYSICAL DEVELOPMENT CENTRE.

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AND

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[Received March 14, 1945.]

## INTRODUCTORY AND HISTORICAL.

IN 1871, shortly after the American Civil War, da Costa [1] described the syndrome which came to be associated with his name and which he termed "irritable heart in soldiers." The War of 1914-18 led to the appearance of more literature on the subject, and the work of Sir Thomas Lewis [2] did much to clarify our knowledge of the condition. In 1941, again in time of war, Sir Adolphe Abrahams [3] described effort syndrome as a physiological reaction to effort with production of disproportionate or premature exhaustion, palpitations, precordial pain, faintness, dizziness and blurred vision.

This condition, often masked in civilian life, is brought into prominence when the physical stresses of military training are brought to bear on large numbers of the population. The outbreak of war is immediately followed by a reawakening of interest in the syndrome, and it is this reawakening of interest that has prompted this report.

Although the syndrome is now accepted and its psychosomatic nature is recognized, there remains a considerable laxity both in making the diagnosis and in the application of suitable treatment to patients in whom the condition has been diagnosed. The impression was growing among certain medical practitioners employed in military duties that effort syndrome responded favourably to a carefully organized regime of graduated physical training such as was provided at Army Physical Development Centres. On the other hand, Sir Adolphe Abrahams had said in 1941 (before the reopening of these Centres) that "in cases of effort syndrome which seem to arise from constitutional inferiority and to have no responsible physical defects the results of physical therapy have been disappointing." Similarly Paul Wood [4] found that "Graduated exercises as the sole method of treatment cannot and do not have the least effect." We therefore decided to investigate effort syndrome at a Physical Development Centre both with regards the accuracy with which the diagnosis was being made and with regards the results of training.

Howitt and Wesson [5] have described the aims and routine of the Army Physical Development Centres. It is sufficient to say here that at these Centres the substandard recruit is given specially progressive physical and remedial training under the medical supervision of Physical Medicine Specialists of the Royal Army Medical Corps. Over 80 per cent of the personnel which now attend these Centres successfully pass tests which enable them to maintain a high medical category.

## THE INVESTIGATION.

For the purposes of this investigation we saw all men who were regarded as possibly suffering from effort syndrome who were at this Physical Development Centre between January and April, 1944. In all we saw 58 men who were referred to us as possible cases of effort syndrome. Of these 39 had been definitely given this label by medical officers. But in only 9 of these cases could we agree that we were dealing with true effort syndrome. This was largely attributable to our somewhat exacting standard of history taking. A mere complaint of breathlessness or exhaustion after exercise was not considered sufficient and thus the majority of the referred cases were eliminated. In establishing the diagnosis to

our satisfaction we based our decisions on the presence of the following diagnostic criteria.

(a) *Difficulty in Respiration*.—The common complaint was of dyspnoea on exertion, but in those we accepted as cases of true effort syndrome a complaint was usually found of similar difficulty at rest or even in bed. The complaint was usually of difficulty in expanding the chest sufficiently to get the air in.

(b) *Pain in the Præcordium*.—This was variously described as stabbing, sharp or dull and aching. It was not necessarily confined to the præcordium or submammary area but in some cases radiated to the right of the chest or through to the scapula.

(c) *Palpitation*.—A history of palpitation was not always easy to obtain without asking a leading question, but, when asked if they were ever aware of the presence of their hearts, the men always answered either that they suffered from palpitation or that "their hearts thumped."

(d) *Dizziness*.—In all but one of those whom we considered to be suffering from true effort syndrome there was a complaint of a sense of insecurity, often explained with difficulty and described as dizziness or giddiness.

(e) *Exhaustion*.—The usual complaint was of being easily and prematurely tired.

Other complaints were of *nervousness, tremor, restlessness and sleeplessness*.

Apart from the 9 men in whom we diagnosed true effort syndrome, the diagnoses made in the remaining 49 cases were as follows:—

Poor training, poor physique or debility following illness..	31
Neuroses other than effort syndrome .. .. .	6
Bronchitis.. .. .	3
Pleurodynia .. .. .	3
Nasal obstruction .. .. .	3
Asthma .. .. .	2
Migraine .. .. .	1
	<hr/>
	49

In those whom we diagnosed as true effort syndrome, the age-spread was from 18 to 34 and 6 of the 9 had been less than a year in the Army. None of the 3 who had served more than a year had proved useful soldiers and they had spent much time in hospital and in being investigated. It was interesting and satisfactory to find that only 3 of the men spoke specifically of their hearts. The former popular connexion between the syndrome and the cardiovascular system seems to be dying. It was unusual to find any specific cause being held responsible for the ill-health, but in the 3 cases where the men did speak of their hearts, two men ascribed their trouble to an attack of rheumatic fever in boyhood and the other spoke of being told that he had suffered from a "cardiac heart" as a schoolboy. We were impressed by the distinctive attitude of these men. They all gave the impression of not only being perfectly genuine in themselves but also of accepted resignation to the hopelessness of their cases and the uselessness of any efforts to remedy them.

#### RESULTS OF TRAINING.

The progress and final disposal of all 58 men were analysed. This was made easy by the admirable system of periodical medical overhaul and progress reports used at the Physical Development Centre. In the 49 men whom we did not agree to be suffering from effort syndrome a high average of success was achieved by the training; no fewer than 45 responded satisfactorily and were able to be confirmed in a high medical category. This was an even higher percentage of success than is usual.

Of the 9 cases of true effort syndrome, 6 failed to respond to training at any stage and whenever they were re-examined complained that they were either worse than ever or at least no better. These were referred for employment in low medical category or to Medical Boards for review. Three cases of true effort syndrome were found to have responded to the individual coaching and carefully graduated training carried out at the Centre. They had responded sufficiently well to perform adequately the somewhat rigorous tests imposed at the end of eight weeks' training.

That these 3 men should have done well while the remaining 6 had done badly caused us some surprise. If their improvement was genuine and lasting it would be of great importance to scrutinize every detail of their training and treatment in an effort to find the factors responsible for improvement in this limited number of men. That the careful individual coaching and encouragement, especially applied to those whose response to routine training was poor, might be of value in a psychosomatic condition such as this was not unlikely, but why had improvement occurred in only 3 of 9 cases? Before attempting a detailed analysis of the training environment of these 3 cases we wrote to the medical officers under whose care the men now were to ascertain how they had got on after leaving the Centre.

This inquiry revealed that any improvement made at the Physical Development Centre had been temporary, that their complaints and symptoms remained unchanged, and that they claimed to have received little if any benefit from their course of training.

#### CONCLUSIONS.

We are thus led to the conclusion that while there are men in the Army to whom the label effort syndrome has been loosely and wrongly attached and while men such as these do well at the Physical Development Centre, the genuine case of effort syndrome will respond to training only temporarily, if at all. Thus to send a true case of effort syndrome to the Physical Development Centre is a waste of time and money.

On the other hand, to state categorically that effort syndrome is a condition unsuitable for training at these Centres is not justifiable while the condition is being wrongly diagnosed in a considerable number of men who respond remarkably well to the training. Thus there is a need for a more accurate diagnosis of the condition, and for a more restricted application of the term effort syndrome based on stricter criteria of diagnosis.

#### SUMMARY.

Fifty-eight possible cases of effort syndrome were seen at a Physical Development Centre.

Forty-nine were considered not to be suffering from true effort syndrome. Forty-five of these cases responded well to training.

Nine cases were considered to be genuinely suffering from true effort syndrome. Six of these failed altogether to respond to training; three responded temporarily but their symptoms returned after they had been posted to their units.

It is concluded that true effort syndrome does not repay training at Physical Development Centres.

We wish to express our thanks to the Commanding Officer and to the Specialist in Physical Medicine at the Physical Development Centre for their help in this investigation.

#### REFERENCES.

- [1] DA COSTA, J. M., "On Irritable Heart," *Amer. J. Med. Sciences*, 1871, **61**, 17-52.
- [2] LEWIS, Sir THOMAS, "The Soldier's Heart and Effort Syndrome," London, 1918.
- [3] ABRAHAM, Sir ADOLPHE, *Lancet*, April 5, 1941, p. 437.
- [4] WOOD, PAUL, *Practitioner*, December, 1941, No. 147, p. 771.
- [5] HOWITT, F. D., and WESSON, A. S., *Lancet*, March 28, 1942, p. 373.

## *Clinical and Other Notes.*

### NOTE ON A VISIT TO MEDICAL UNITS IN 21 ARMY GROUP.<sup>1</sup>

By Professor J. R. LEARMONTH.

[Received April 3, 1945.]

Soon after D-day it must have been obvious to anyone who had to deal with convoys from Normandy that the arrangements for their immediate treatment in advanced units had reached a standard of surgical competence and administrative smoothness which was almost unbelievably high. Thus in one ward under my care, of 141 wounds bacteriologically examined three to fourteen days after their infliction, only 8 (5·6 per cent) showed infection by hæmolytic streptococci; and the majority of the 141 were treated successfully by secondary suture. Therefore when, on a mission for the Medical Research Council, I was granted by 21 Army Group the privilege of visiting certain units in Holland and Belgium, I was prepared to see surgical work of the highest standard. I stayed in a Casualty Clearing Station in Holland about three miles from the line. This was housed in a brick-built school, lit by electricity generated in a neighbouring village, and manned by three surgical teams with their complement of nurses. On his arrival, the wounded man was taken to a resuscitation ward, carefully examined, and if necessary given a transfusion; during which a medical officer was in almost constant attendance to determine the optimum time for operation, a decision of vital importance for the subsequent welfare of the patient. When the time for operation came, I found that the members of the surgical team on duty were waiting in white operating clothes; the anæsthetic was carefully chosen and expertly administered; and the operation itself was conducted with a smooth competence and a finished technique. Thereafter the wounded man was transferred to a roomy ward, to a real bed with real sheets, where he was tended by a highly trained nursing staff. Here the appropriate after-care was begun, and nothing was lacking for its success. Infusion or transfusion might be continued; a penicillin drip apparatus was set going, and in abdominal cases a Ryle's tube was passed and attached to a suction apparatus. It seemed to me that, if the patient had any chance of recovery, it was provided for him; the arrangements could hardly have been bettered in a teaching hospital in Britain. And certainly what were, to me, some remarkable recoveries were proceeding with a lack of incident which was equally remarkable. Where all the work was so good, it is difficult to give an example. But I shall always have a clear mental picture of a cheerful soul, nine days after wounding, who was making an uneventful convalescence after (1) resection of two lengths of small intestine, one near the duodeno-jejunal flexure; (2) repair of a wound of the third part of the duodenum; and (3) toilet of a severe bruise of the body of the pancreas. Equally striking was the absorbed interest taken in their work by the medical and nursing staff. Cases were discussed and re-discussed, advice exchanged and weighed, and ward rounds conducted to which came those medical officers from more forward units who were free to attend. The last admirable arrangement helped to dispose of the feeling, inevitable on a line of evacuation, that patients passed out of the ken of each unit in turn, on their journey towards the rear.

One can only dimly conceive the immense amount of detailed thought and organization, from the highest level to the lowest, required for the attainment of such superlative results: and I am proud indeed to have the opportunity of paying this tribute of a civilian surgeon to the work in the field.

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<sup>1</sup> With acknowledgment to the Department of Health Bulletin, Scotland.



## COLOUR PHOTOGRAPHY AS AN AID TO MEDICINE.

By Qmr.-Serjt. ARTHUR H. THROWER, F.R.Econ.S.,  
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[Received August 26, 1944.]

THE Medical Research Council recently announced arrangements for colour photographs of unusual conditions and clinical appearances to be taken in Military and Civil hospitals with the object of forming a reference library of colour photographs of selected cases.

It may be of interest to consider how far the use of colour photographs could be extended from the "post-diagnostic" stage by the use of such photographs to assist in the making of actual diagnoses. Probably the first attempt made was in the bush territory of the Gold Coast Colony in 1943 when I was able to interest the Chief of an inland tribe in first-aid and colour photography and eventually in a combination of the two. The tribal "medicine man" was a young Dagomba native who had learned a few hundred words of English and taken a first-aid course at a Government hospital on the Coast; returning to his tribal settlement with a nursing dictionary, a first-aid box and unlimited confidence in his ability to deal with any case that turned up.

The tribal clearing was approached by a track just wide enough to admit a man on foot or on a pedal cycle. This path was some twenty-five miles in length and joined on to the recognized cart track and the nearest qualified European doctor lived some 15 miles down the cart road. In these circumstances there is no doubt that the native nurse rendered great service to his tribe and fully earned his daily portion of yam and palm oil with its accompanying calabash of palm wine and, so long as routine cases only came along, he was both happy and efficient.

Occasionally, however, something more difficult turned up; a tropical ulcer he could not quite deal with, a foot condition beyond his experience or a sting or bite from a jungle insect or reptile he had not met before. When this occurred he found himself in need of a "second opinion" and this could only be obtained by bringing the white doctor forty miles by car and cycle (a very difficult thing to do as even white doctors do not regard such journeys with enthusiasm) or take the patient on foot or in a litter to the doctor. This is, of course, very wearying to the patient and all concerned but there was no other way until it occurred to him that some conditions would photograph very well and that the white doctor might be able to do as well from seeing a colour photograph as he could from seeing the patient himself.

The first suitable case was not long in coming and a colour plate was exposed in an ordinary camera and developed. The technique of developing such photographs is very simple and a really good picture can be taken and developed ready for examination in fifteen minutes at practically no expense. This photograph, perhaps one of the first "clinical pictures" to be made in colour, was taken along with written notes on the case to the white doctor's post by a small native boy on a bicycle who arrived back some hours later with instructions for the treatment of the case and the necessary supplies for carrying out the treatment recommended. Thus the case was treated in the village with a great saving of inconvenience to the patient and the saving of the white doctor's time and energy. By good fortune the patient's condition improved and when he was eventually able to be taken on the weekly lorry from the lorry station on the main track to the hospital he made a good recovery. The system, so far as I am aware, still works in this remote spot with a reasonable amount of success and there must be very many similar places in the tropical areas of the great continents where such a method would be of value. It must be realized, of course, that this does not prevent the doctor from visiting the tribal settlements because, in actual fact, he could not visit a case to order even if it was always desirable for him to do so. In the tropical areas of Africa a doctor's "parish" may cover up to a thousand square miles of thickly overgrown jungle land and his time is, in any case, almost always occupied at his medical post or the hospital of the mission.

station to which he is attached. The native medical man (in those tribes where the Chief is sufficiently educated to employ one) is called on to undertake to the best of his ability anything up to a major operation and the only alternative to his undertaking major work is letting the patient go untreated and hoping for the best. The general rule seems to be that each Native Administration sends to a Government School one or two representatives of the tribe who become nurses and dispensers according to their abilities, and who do really take over the functions in the tribal village which are taken over by doctors in England. In such circumstances it will be readily understood not only how much the qualified doctor's visits on circuit are looked forward to but also how useful a well organized system of making colour pictures and sending them to the nearest doctor in an emergency can be, as the native worker's knowledge of English invariably leaves much to be desired and the colour photograph dispenses with the necessity of a great deal of difficult descriptive work in reports.

The use of colour photography for this purpose will probably never be a practical proposition in England and other civilized countries where specialists can be called upon by telephone and rushed from one place to another by car and train but it seems possible that it might well be used for this purpose in any place where it is hard to get a specialist's opinion and even perhaps with armies in the field where gases may be used as a means of warfare over long fronts.

The main difficulty is that in the tropical areas the skin pigmentation of the inhabitants precludes a really sharp colour definition, but such conditions as tropical ulcers, stings, bites, injuries to the eyes, etc., produce very good pictures even in the comparatively inexperienced hands of native photographers. The African's quick grasp of mechanical and scientific processes makes the good development of the picture once taken a certainty and very seldom are such pictures spoiled in the processing by native workmen.

An additional advantage of the scheme employed in the Gold Coast is that the fortunate white doctor at the receiving end obtains a really splendid colour record of tropical conditions without the fatigue and expense of penetrating into the jungle to get them.

#### SOME IMPRESSIONS FROM A MILITARY REGISTRAR OF A TRANSIT HOSPITAL IN SOUTHERN ENGLAND.

By Major H. M. MARTINEAU,  
*Welsh Guards.*

[Received August 30, 1944.]

TRANSIT Hospital, E.M.S.—An R.A.M.C. man on seeing the above title might visualize a C.C.S. staffed by military personnel, but an E.M.S. transit hospital is staffed by civilian doctors and nurses, the only military personnel being the Military Registrar and Assistant Registrar and his administrative staff.

Shortly before D-Day extra military personnel, such as R.A.M.C. stretcher bearers, cooks and clerks, a Pioneer Corps N.C.O., an interpreter and Infantry men to guard P.O.Ws., were drafted to this transit hospital to assist in the heavy work which lay ahead.

What do these men do? How are the wounded received? It is the wish of the writer to try and give from a military angle a glimpse of the work carried out.

In the Enquiry Office of the Military Registrar's block a clerk and a messenger are always on duty. The telephone rings and the following message is received—"A convoy is due to arrive at — at 01.30 hours." The Registrar, Assistant Registrar and Serjeant-Major are informed and the machinery for calling in all key personnel of the military staff is set in motion. These men live out in the surrounding districts and must be rounded up, either by 'phone or by the use of a "calling up" man. They are all on "Call 1" or "First Warning Call." As they arrive they muster in the main office.

A progress book is kept and in this is entered the time of receipt of "First Warning" and all other events as they occur.

The telephone rings again at 02.45 hours and the message received is—" Train has arrived at — 180 stretcher cases, 98 walking cases and 24 Prisoners of War, 302 in all."

Stretcher Bearers, Cooks, Mess Room Orderly, Operating Theatre Orderlies, Regimental Police and Interpreter are now called and the preparation of documentation slips, N.A.A.F.I. Coupons, etc., is started. This activity is called " Second Call Action."

Within twenty minutes of " Second Call," N.C.O.s i/c Stretcher Bearer squads, Theatre Orderlies, Cooks, etc., report to the Serjeant-Major that their men are present and at action stations—the stretcher bearers are placed so that one squad works wards 1—8, another squad, wards 9—16, with a smaller squad to outlying Villas, which is the name given to compounds of Special Wards. Each squad consists of 24 men ; at the ends of the row of Wards 5 men are allotted to unload ambulances (3 inside and 2 outside) and the remainder carry the patients. The Cooks and Mess Room Orderlies go to the kitchen and prepare a hot meal and tea for 302 patients and refreshments for all personnel working on the convoy.

There are five positions to be manned by Regimental Police, who direct ambulances to their correct positions and keep other traffic off the route.

The first ambulance has arrived and work has begun. There are two receiving doctors at either end of the row of wards and the patients are carried to these positions. The Field Medical Card is scrutinized and a decision is made regarding the ward to which the patient is to go. This is noted by the clerks on their check forms, both Military and Civil, and the patient is despatched to the safe keeping of the Medical Services.

In the ward the clerk upon whom the responsibility of accurate documentation rests obtains the necessary particulars to ensure complete knowledge of the patient for the purpose of Records and next of kin. This is no mean job and is of a very exacting nature.

Physicians and surgeons then commence their tour of the wards, portable X-ray apparatus is taken round where necessary and the patient is attended to with the least possible inconvenience to himself.

Meanwhile, at the Military Registrar's Office, the duty clerk has informed the District Paymaster that a convoy has been received and his presence is required as early as possible to change the French currency of the patients. The number of patients is given so that he can assess the amount of English cash required. This is done for all Allied casualties. Here also we find the necessary information concerning men placed on the Dangerously and Seriously Ill Lists so that the appropriate telegrams can be sent to the " Next of Kin " and the Authorities concerned.

Men who have under 7s. worth of French currency are given a casual payment of 10s. As soon as it is practicable and it is known that the patients are in possession of English money, R.A.M.C. orderlies are despatched to the wards armed with note books, pencils and haversacks. They go round the wards and collect the N.A.A.F.I. coupon which was issued by the clerk who carried out the documentation, tell each patient what he may get for his coupon (forty cigarettes, chocolate, razor blade and matches) and also they make lists of further requirements such as notepaper, etc., for each man.

The patient has not been without a cigarette all this time though, as the Red Cross and the Hospital Gift Department have made each man a gift of forty cigarettes. People in the surrounding district have also been interviewed by the military office and the Gift Department and have sent contributions.

Patients' telegrams arrive at the military office for censorship and afterwards are initialled by two hard worked ladies who send them off free of charge, the expense being borne by the Red Cross. If the man cannot write, these ladies write for him, sending either a telegram or post-card.

Meanwhile the Military Store is by no means idle. All dirty underwear, muddy and blood-stained clothing, is collected under the supervision of the N.C.O. i/c Stores, clean replacements and new uniforms are issued, together with razor and toilet articles. Nothing is forgotten.

In the civilian office preparations are in progress for evacuating all casualties who can be moved safely to a Base Hospital. Green cards are used for patients considered fit to undergo

the journey but may be cancelled at the last minute if necessary. The only exceptions are the Canadians. The same arrangements are made but their own ambulances arrive to take them to Canadian Hospitals. R.A.M.C. stretcher bearers prepare them and load the Ambulances.

The work attached to the despatch of a convoy is very heavy indeed—260 of these 302 patients are to be evacuated. The time is announced, R.A.M.C. personnel draw stretchers and blankets which are distributed to the wards which house the patients, each patient is prepared, put on to the stretcher and carried out to the ambulance. As many inter-ward transfers have taken place since the arrival of the convoy and many patients are in the villas some 500 yards away, collecting the men is a difficult business.

Those patients who are unfit for evacuation remain in hospital and are likely to become our ordinary patients. The ordinary admission procedure is executed. While the men are "Transit patients" they are not allowed to tell their relatives where they are, mainly for fear of unnecessary journeys being undertaken by relatives who may arrive at the hospital only to find that "Bill" has gone away that morning. Once the patient is admitted though, he may tell anyone he likes where he is and relatives can come in comfort and are welcomed by all concerned.

Prisoners of War receive practically the same treatment. Documentation in respect of the Prisoners of War is very technical and for this work the interpreter is invaluable. As a precautionary measure they are guarded, but their contented smiles give one the impression that the idea of escape is far away. Be that as it may, it is seen that no opportunity occurs.

It can be plainly seen that the work is continuous. It may be that two convoys are received and two evacuations dealt with in twenty-four hours—but no one minds, the same amount of energy and interest is given to each.

And so it goes on—the washed, shaven and smiling faces of the outgoing patients denote a great difference from their state on admission. The happy demeanour of the patients shows that they are deeply conscious that no effort is spared to make the fleeting visit as happy and comfortable as possible. Many try to express their gratitude for what has been done on their behalf but all concerned consider it a great privilege to welcome them and to God speed them on their way.

It is sufficient for us that they should have a swift recovery to full health and spirits.

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### AN IMPROVISED HÆMOCYTOMETER COVERSILIP.

By Corporal ERNEST RAYSON,  
*Royal Army Medical Corps.*

[Received March 23, 1944]

A THICK, heavy, glass coverslip is an essential component part of any hæmocytometer counting chamber. Its chief merit is that its weight will overcome the surface-tension of the drop of fluid beneath it and allow it to rest evenly on the chamber supports. An ordinary thin glass coverslip, being light, floats on the fluid, giving a false depth to the "counting chamber," varying the volume of the fluid and thus producing inaccurate counts.

Thick glass hæmocytometer coverslips are notoriously easily broken and, in these times, not easily replaced, particularly on field service. An improvised useful substitute is suggested which is obviously simple but adequately efficient and can be devised in any laboratory.

Two, three or four (according to thickness) thin glass coverslips, as ordinarily used for microscopic work, three-quarters inch square, are cemented together with Canada balsam and dried in an incubator. Together they are sufficiently heavy to rest evenly on the counting chamber above the fluid. The cement is clear and, moreover, renders the improvised hæmocytometer coverslip less easily broken.

## A METHOD OF MAINTAINING EXTENSION ON THE THOMAS' SPLINT.

By Captain J. H. BULLEID,  
Royal Army Medical Corps.

[Received March 24, 1944.]

IN the field all first-aid methods of maintaining extension on the Thomas' splint necessitate the use of some form of Spanish windlass. Tension is obtained by twisting the windlass with a stick.

In practice sticks and other objects used for the same purpose have not been found satisfactory since they may slip or break.

To overcome these faults the suggested method advocates the use of an iron bar to produce tension. This bar is made from  $\frac{3}{16}$  inch iron rod in the form of a shepherd's crook and has an overall length of 5 inches (see fig. 1). It possesses these advantages:—

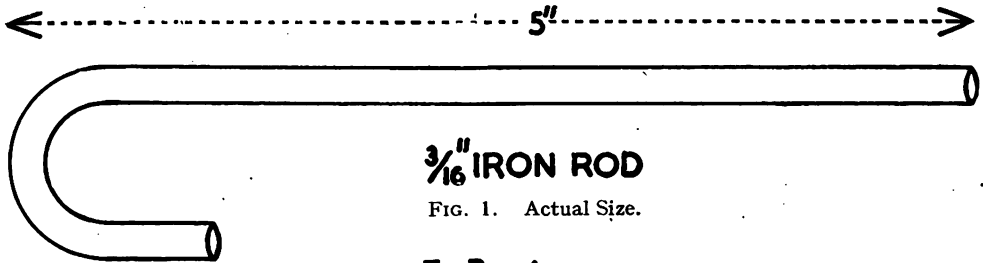
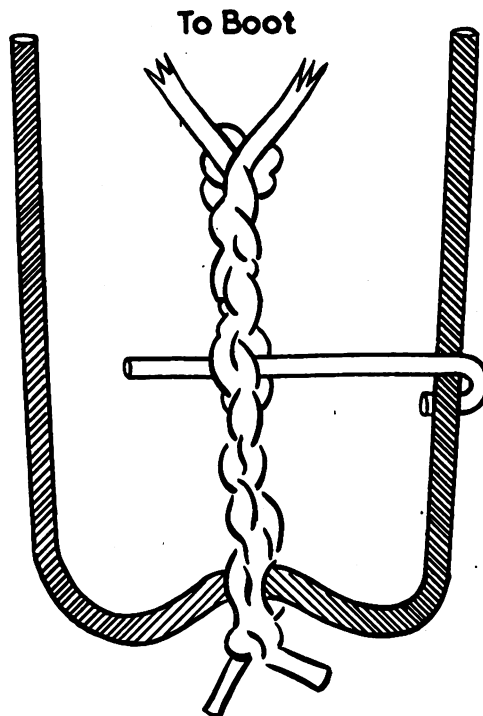


FIG. 1. Actual Size.



BAR IN POSITION

FIG. 2.

- (1) It can be hooked on to the side of the splint and therefore cannot slip (see fig. 2).
- (2) It cannot break.
- (3) It is neat and easily applied.
- (4) R.E.M.E. can make the requisite numbers quickly and at little cost.

The windlass should be made with tape (a tape supplied by the Royal Engineers was found most satisfactory) since flannelette bandage or other materials were found to tear or stretch under strain. The tape should be applied to the boot by the excellent method described by Lieutenant-Colonel F. A. Bevan, R.A.M.C., in the *Journal* of November, 1943.

The boot is first padded in front, anterior to the ankle joint, and behind over the tendo Achilles.

The tape is placed with its centre over the anterior pad. The two ends are then passed behind the boot, crossed over the posterior pad and brought forwards and downwards to be tied in a firm knot below the boot in the groove between the sole and heel. The ends of the tape are then tied to the end of the splint to form the windlass. Extension is produced in the normal way by twisting the tape with the bar and, when sufficient extension has been obtained, the bar is hooked on to the side of the splint.

This bar and tape method produces and maintains strong extension, which can be instantly readjusted. The windlass is neat and cannot get caught in extraneous objects. There is never any risk of slipping or breaking and the tension produced is constant.

As an R.M.O. I have used this method for two years with complete satisfaction.

I am indebted to Major Law, O.B.E., F.R.C.S., R.A.M.C., for his kind advice.

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### Current Literature.

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JOHNSTON, W. A., & HEYDEMANN, J. **Clinical and Radiological Studies of Pulmonary Mycosis.** *Radiology*. 1944, July, v. 43, No. 1, 1-13, 10 figs. [36 refs].

The yeast fungus was first observed by Hook in 1677 and since then yeast infections of all types have been reported from various parts of North and South America and Europe. Susceptibility does not vary with race, colour or age and the infection is not transmissible. Its manifestations vary with the organ involved and there has been, unfortunately, a tendency to consider each manifestation as a separate disease rather than one type of yeast infection.

*Pathology.*—The spores of yeast are resistant and withstand cold and drying to a considerable degree. The primary infection is most often in the respiratory tract. The yeast diseases do not seem to attract much bodily defensive reaction in the form of cellular infiltration or fibrosis. Abscess formation may follow yeast infection or may be due to superadded secondary infection. Widespread blood-stream involvement is associated with a high mortality rate and is generally seen in the coccidioidal granuloma, torula infection and more rarely in moniliasis, blastomycosis and other mycotic infections. In the lungs, it is unlikely that the majority of yeast infections ever get beyond the bronchi and a microscopic appearance of a mycotic infection is similar to a tubercular granuloma.

*Clinical Symptoms.*—The symptoms depend upon the degree, type and virulence of the infection. Mild cases give generalized bronchitic changes; severe cases are associated with malaise, low-grade fever, night sweats, hæmoptysis and a foul nauseating sputum. The peculiar odour of the sputum may be the only clinical pointer to the diagnosis of yeast infection. The physical signs may be indistinguishable from tuberculosis, sarcoidosis, pneumoconiosis and many other lung infections. The ultimate diagnosis rests with the bacteriologist.

*X-ray Findings.*—The earliest lesions are those of increased broncho-vascular markings. These commence as unilateral lesions but soon become bilateral. Hilar adenopathy is not marked. Later, patchy areas of the infiltration appear in the parenchyma generally following a bronchial pattern. Pleural effusion is rare. Another type of involvement shows faint fuzzy shadows along the broncho-vascular structure, giving it a ground glass appearance. Later, moderate fibrosis may develop. In the actino-mycotic infection the lesion may break

down with sinus formation. Under treatment the lesions may rapidly disappear. Tuberculosis may be superadded as a secondary infection. The authors feel that the modern tendency to disregard yeast infection, once the tubercle bacillus has been demonstrated, is a definite mistake and maintain that improvement in the tuberculosis lesion cannot be expected until the yeast infection has been eradicated.

*Treatment.*—The universal and most successful form of treatment of pulmonary mycosis appears to be iodine medications and deep X-ray therapy. The author reports eight cases of mycotic lung infections.

ERIC SAMUEL.

Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.

PETERSON, V. L. **Fungus Disease of the Chest.** *Radiology.* 1944, July, v. 43, No. 1, 14–20, 11 figs.

The skin is the structure most commonly affected by fungus infection; pulmonary and osseous involvements also occur.

The author presents several proved cases of lung infection with *Coccidioides*, *Actinomyces*, *Aspergillus*, *Monilia Torula* and *Blastomycosis*. One fourth of the cases showed fungus infection in other parts of the body. The radiological picture is not characteristic, but atypical appearances of pulmonary inflammation should suggest the possibility of fungus infection.

*Coccidioidomycosis.*—Twenty-four cases of this condition were diagnosed and confirmed by culture of the causative agent from the sputum, or by agglutination tests on the blood.

The radiological appearances, according to their frequency, were:—

(a) *Solitary nodose areas* of inflammation which later broke down to form a thin-walled cavity. In other instances the nodose lesions were scattered throughout the lung fields.

(b) *Infiltrative lesions* involving both upper lobes and closely mimicking tuberculous lesions.

(c) *Hilar adenopathy.*

The cases were involved over periods of two months to one year during which time the infiltrative lesions cleared slowly, but little or no change occurred in the cavities. All patients were from stations in the south-western States of the U.S.A. Bronchiectasis may occur as a sequela.

*Actinomycosis.*—Actinomycotic infection may be one of four types—(a) pulmonary; (b) pleuro-pulmonary; (c) pleural; and (d) thoracic. The cardinal radiological feature is the manner in which infection spreads across the fascial planes.

*Aspergillosis.*—Radiographs of patients suffering from *Aspergillus* infection of the lung fields appear as a soft, irregular, peribronchial or parenchymal infiltration. These cases showed little change until iodine therapy was instituted.

*Monilia albicans.*—This fungus is often harboured by man and is a secondary invader in pulmonary disease. In rare instances it produces primary lung lesions. The radiological appearances are those of bilateral peribronchial inflammation. If untreated, the lesion resolves with pulmonary fibrosis.

*Torulosis and Blastomycosis.*—Both these types of infection are rare in man. Radiologically the appearances may be indistinguishable from tuberculosis. [Fungus infection appears to be commoner in the U.S.A. and the infection appears to have become more widespread after the drafting of men from the Northern States into training camps in the South.]

ERIC SAMUEL.

Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.

## Reviews.

### THE JOURNAL OF THE INDIAN ARMY MEDICAL CORPS.

Our youngest contemporary made its first appearance in January, 1945. In the words of the Editor, "The scope of this Journal will be as wide as possible, containing not only articles of professional interest but also news letters of general interest and reports of experiences gained on the field."

The first number reflects the greatest credit on both Editorial and Management Staffs. It is attractively produced, the cover being cherry with gold lettering. The make-up, printing and illustrations leave nothing to be desired and the proof-readers have done their work well. The Editor is to be congratulated on having got together so much interesting material and the professional articles are of a high standard.

In a new Corps, building up its own traditions on those inherited from the Indian Medical Service, the Indian Medical Department and the Indian Hospital Corps, it was a wise decision to make the scope of the Journal as wide as has been done. It will have a strong appeal to all ranks.

If the standard set by this first number is maintained, this Journal will play no small part in helping to weld the Indian Army Medical Corps into an efficient Corps with its own traditions.

It is to be hoped that the Officers of the I.A.M.C. will support their Journal by writing articles embodying original research and clinical experience. Without such contributions the task of an Editor is indeed difficult. There is a vast field of research open to the I.A.M.C., and with great traditions behind them we may expect that the professional side of this Journal will attain, and maintain, a very high standard. Officers should be encouraged to contribute original articles to their own journal and not be led astray by the temptation to write solely for contemporaries with an established circulation.

The Editor is to be complimented on his first number and we wish him all success in the future.

The Times of India Press also deserve praise on their production and the way in which they have overcome paper difficulties.

V.D. LECTURES FOR NURSES. . By Reynold H. Boyd, M.B., Ch.B., F.R.C.S. Edin. London : William Heinemann Medical Books. 1945. Pp. 24. Price 2s.

Nurses are becoming more and more interested in V.D. as evidenced by the meeting held at the Royal College of Nursing on March 15, 1945. Few get adequate teaching in the subject, so that the appearance of this little pamphlet is singularly opportune ; it does not tell the nurse *all* that she or he needs to know about V.D., but it does give a lot of useful information. Some account of the nursing of cases of arsenical exfoliative dermatitis—and nursing is 90 per cent of the battle in these cases—and of the technique of penicillin injections, would have added greatly to the value of this publication. The general production is first class.

T. E. O.

A HISTORY OF THE ROYAL INSTITUTE OF HYGIENE. By A. Seymour Harding, Honorary Fellow (Late General Secretary).

In this brochure, Mr. Seymour Harding, Secretary for thirty years, sets forth simply and readably, the history of the Institute from its foundation in 1903, through the years 1929, when His Majesty granted a Royal Charter, and 1937 when, by amalgamation with the Institute of Public Health, the Royal Institute of Hygiene and Public Health came into being, to this day when happily the Royal Institute continues to flourish among us as teacher and monitor.

Here, as we read of the triumphs and set-backs that marked the growth of the Institute, we appreciate also the immense amount of good work done in man's service.



A SYNOPSIS OF MEDICINE. Eighth Edition. By Sir Henry Letheby Tidy, *K.B.E.*, M.A., M.D., B.Ch.Oxon., F.R.C.P.Lond. Bristol: John Wright & Sons, Ltd. London: Simpkin Marshall (1941) Ltd. 1945. Pp. xx + 1,215. Price 30s. net.

This work needs no words of introduction. Since its first edition in 1920 it has been used widely in preparation for both qualifying and higher examinations, and there can be few physicians in this country who do not number it amongst reference books to be kept within easy reach.

The essentials of medicine are set out excellently and its admirable summaries of treatment enhance the practical value of the book, for which room can easily be found in the valise.

Considerable labour has been involved in bringing this edition up to date, and the changes indicate the considerable progress of knowledge and outlook in the past six years. To give examples: in addition to the numerous revisions we find new chapters devoted to Infective Hepatitis and Effort Syndrome, and sections on the Sulphonamide Compounds, Primary Atypical Pneumonia, Crush Syndrome and Sarcoidosis.

The publication of the first edition was delayed by the author's War service; the latest revision has again been held up by the War, and this time the author has served as a Consulting Physician to the British Army. The quality of the production has suffered very little from the special difficulties with which it has been fraught, including repeated bomb damage to the premises of the publishers, and we must congratulate them as well as the distinguished author.

SYNOPSIS OF FORENSIC MEDICINE AND TOXICOLOGY. Second Edition. By E. W. Caryl Thomas, M.D., B.Sc.Lond., D.P.H. Bristol: John Wright & Sons, Ltd. London: Simpkin Marshall (1941), Ltd. 1945. Pp. viii + 179. Price 10s. net.

To the medical student, forensic medicine is one of the most fascinating subjects. Once qualified, the practitioner may go many years before he comes up against a serious medico-legal problem.

Medico-legal problems, although they may present themselves infrequently to most people, always do so suddenly. In face of such a problem, the possession of such a book which sets out the main points to be watched, both medical and legal, is a *sine qua non*. Having read this book, we feel it fulfils such a purpose in a most admirable fashion. It is well set out, well printed and, within its small size, contains very full details.

The book should also prove useful to the medical student working for his examination and to members of the legal profession.

TAKE CARE OF YOUR FEET. Published for the Foot Health Educational Bureau by George Gill & Sons. Pp. vi + 129. Price 5s.

This is a collection of short articles by various authors, including some surgeons and chiropodists, on the care of the feet and footwear. It is intended for teachers, welfare workers and the general public, and contains much useful information. C. G.

The following publications have been received and placed in the Library, Royal Army Medical College:—

(1) MEDICAL RESEARCH COUNCIL. Special Report Series No. 249. Studies of Burns and Scalds (Reports of the Burns Unit, Royal Infirmary, Glasgow, 1942-43). London: H.M. Stationery Office. 1944. Pp. 210. Price 4s. net.

(2) INCOME TAX FOR H.M. FORCES AND DEMOBILIZED PERSONNEL. By Captain G. B. Burr. London: Jordan & Sons. 1945. Pp. 52. Price 2s.

(3) ANTI-MALARIA DRUGS. GENERAL OUTLINE. By Owsei Temkin, M.D., and Elizabeth M. Ramsey, M.D., National Research Council. Division of Medical Sciences. Issued by the Office of Medical Information. Pp. 110. Washington. March, 1944.

## Notices.

### ARMY MEDICAL DEPARTMENT BULLETIN.

*A.M.D. Bulletin* No. 45 and Supplement No. 20, March, 1945, have now been published by the War Office. Distribution scale : one copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

##### Article No.

- 341. *Australia Against the Jungle*.—Dysentery, dengue, scrub typhus and malaria, as they affected the Australian Army in the South West Pacific, are discussed. The article is itself a summary of a lecture delivered at the Royal Society of Medicine and cannot adequately be summarized.
- 342. *On Raising Hares*.—" Careless (medical) talk costs lives " would have been a good alternative title for this article, which draws attention to the dangers of armchair medicine.
- 343. *A Useful Device*.—The description of a simple method of adapting the Service water-bottle for washing out the eye or for use as a feeding-cup.
- 344. *Fewer Deaths from Appendicitis*.—Reduction in the death-rate from appendicitis during the war years is not readily explicable and some of the possible causes are discussed.
- 345. *Abdominal Wounds in Italy*.—Forward units performed over 13,600 operations in the first half of 1944 ; of the 640 patients with abdominal wounds 301 died. Recent trends in treatment are described.
- 346. *University Chair of Medicine*.—Notice of the appointment of a whole-time Professor of Medicine in the University of Manchester is announced.

*Supplement No. 20. Chemotherapy in Brain Wounds and Meningitis*.—This is a full and authoritative account of the local and systemic uses of the sulphonamides and penicillin in the treatment of infections of the central nervous system.

*A.M.D. Bulletin* No. 46 and Supplement No. 21, April, 1945, have now been published by the War Office. Distribution scale : one copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

##### Article No.

- 347. *Fæces, Flies, and Hepatitis* summarizes the ways by which infective hepatitis may be spread. Experiences of New Zealand troops at El Alamein support the view that fæcal contamination is an important source of infection.
- 348. *Another Virus by Mouth* describes the results of investigations made to find out if patients convalescent from poliomyelitis become persistent fæcal excreters.
- 349. *Wound Infection and the Nose* discusses the frequency of nasal carriers of staphylococci and the ways by which carriers may infect wounds. Methods of avoiding such infection are described.
- 350. *Yellow Fever Inoculation* differs from most other inoculations ; living virus is present and the value of immunization depends on correct storage and use of the vaccine.
- 351. *Success or Failure in Scabies Treatment ?* Benzyl benzoate gives 95 per cent success if correctly used ; one cause of failure is described.
- 352. *Penicillin Lamellæ in Ophthalmic Infections* have been found to be better than drops.
- 353. *University Vacancies* : the Chair in Bacteriology at University College Hospital Medical School and a Lectureship in Histology at Liverpool are vacant.

354. *Bumbling is Bad* is a comment on medical writing and is a plea for simple—but not basic—English.

*Supplement No. 21. Principles of Malaria Treatment* describes, in general terms, the principles governing the use of curative and suppressive drugs.

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#### ROYAL ARMY MEDICAL COLLEGE LIBRARY.

Owing to events outside our immediate control the following volumes of the Journal of the Royal Army Medical Corps have been damaged :—

Volumes : 38, 39, 40, 41, 43, 45, 46, 47, 48 and 71.

Volume 69 is missing as also are the numbers of February, 1940, and April, 1941.

The Library Committee would be very grateful if any Officer who has these volumes and is prepared to donate them to the College Library would communicate with the Commandant of the College. We are particularly anxious to replace the missing numbers so that the College set may be complete.

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#### THE ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.

Sir Joseph Barcroft, F.R.S., M.A., M.D., D.Sc., has accepted the invitation of the Council of the Royal Institute of Public Health and Hygiene to be appointed as the Harben Lecturer for 1945.

These three Addresses will be delivered on the subject of " The Respiratory Function of the Blood " in the Lecture Hall of the Institute at 28, Portland Place, London, W.1, on Monday, Tuesday and Wednesday, the 10th, 11th and 12th December, 1945, at 3 p.m. on each day.

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Authors are alone responsible for the statements  
made and the opinions expressed in their papers.

# Journal of the Royal Army Medical Corps.

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## *Original Communications.*

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### PENICILLIN ASSAY METHODS

By Captain GEORGE D. LUMB, M.B., B.S.,  
*Royal Army Medical Corps,*

AND

Sergeant J. M. WILSON,  
*Royal Army Medical Corps.*

*From Central Pathological Laboratory, M.E.F.*

[Received March 14, 1945.]

IN presenting this paper we are setting out the methods used in this Laboratory for the routine investigations associated with penicillin therapy. Now that supplies of penicillin become more plentiful, many laboratories which previously have not had the opportunity of performing sensitivity tests and carrying out penicillin assay will be called upon to do so. The literature dealing with the technique of these tests is scattered throughout the medical journals, and it occurs to us that it would be helpful to embody in one short article a detailed account of the methods employed in a laboratory which has been continuously engaged in such estimations since 1942 (Pulvertaft, 1943). The present account outlines techniques employed whilst studying the cases under treatment in the hospital and also in experimental work on which we have been employed. We have attempted to outline a group of tests which can be used in any laboratory with limited apparatus and which at the same time will make it possible to control all cases undergoing penicillin therapy. These methods represent the modifications we have finally adopted after considerable experience of their use.

### ORGANISM SENSITIVITY TO PENICILLIN.

Our first routine work was in assessing the sensitivity to penicillin of organisms isolated from patients. This we have done by means of the gutter plate (Fleming, 1929, 1942). The original description was of nutrient agar, but we have used a ditch 2 cm. wide cut in the diameter of a blood agar plate, and filled with nutrient agar at 50° C. containing 2.5 units of penicillin per c.c. When this is set the organism under test is smeared across the plate, a control streak being made at the same time of Oxford *Staphylococcus aureus*. The penicillin diffuses out of the gutter into the surrounding blood agar and according to the

sensitivity of the organism under test it will fail to grow for a varying distance on either side of the gutter. Its degree of sensitivity can be judged by the relative zone of inhibition of the Oxford staphylococcus and the test organism. Plates are placed on wooden trays when in the incubator in order to prevent condensation on the lid of the Petri dish. For the purpose of comparison we express our result as a factor against the standard staphylococcus. Thus, if Oxford staphylococcus is inhibited for 12 mm. on either side of the ditch and the test organism is inhibited for 14 mm. the factor is  $\frac{14}{12} = 1.16$ . It is not suggested that one organism is 1.16 times as sensitive as the other, but this has proved a useful method of assessing possible intensity and duration of treatment in many cases. Those organisms with a low factor have required a greater amount of the drug to eradicate them from the patient.

If it is necessary to provide a result quickly the pus, sputum or other material containing the organism, may be streaked on the plate, but obviously, if time allows, more clear-cut readings will be obtained by isolating the predominant organism. In any case preliminary findings must be confirmed using a pure growth of the organism.

As a substitute for penicillin in the ditch, urine from patients receiving the drug may be used. The actual concentration of penicillin in the gutter is not of great importance as any inhibition can be checked against the control staphylococcus which should always be included on each plate. As many as ten tests may be performed on each plate.

The *Staph. aureus* used as a standard in this laboratory is a subculture from the original Oxford organism. Maintenance is on refrigerated agar slopes. Broth subcultures are made weekly and, after twenty-four hours incubation, fresh agar slopes are inoculated, incubated, and returned to the refrigerator.

*Double Ditch.*—We have found a useful variation of the above to be a method originally described by Fleming (1929)—a double gutter plate. Gutters are cut on either side of a blood agar plate, one being filled with penicillin agar, as previously described, and the other filled with agar containing one of the sulphonamide series of drugs, the one most frequently used being sulphadiazine.

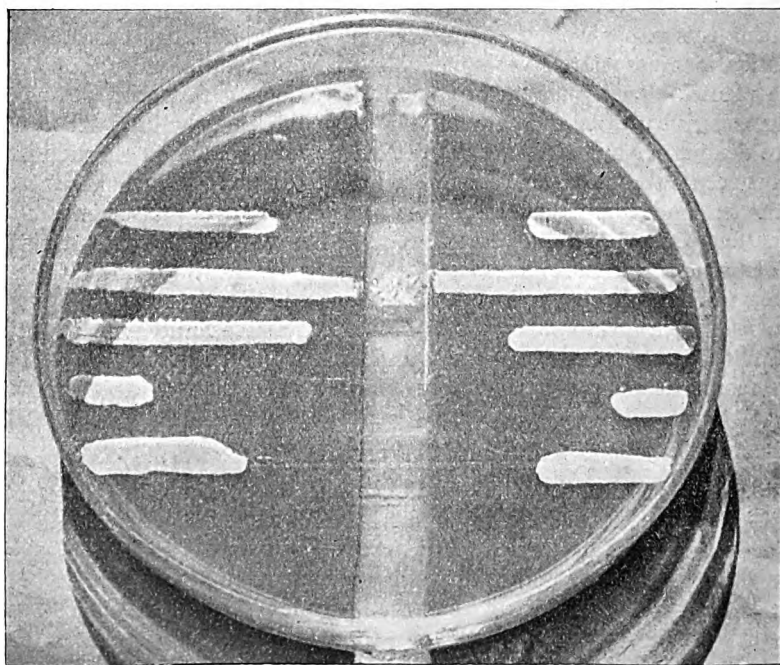


FIG. 1

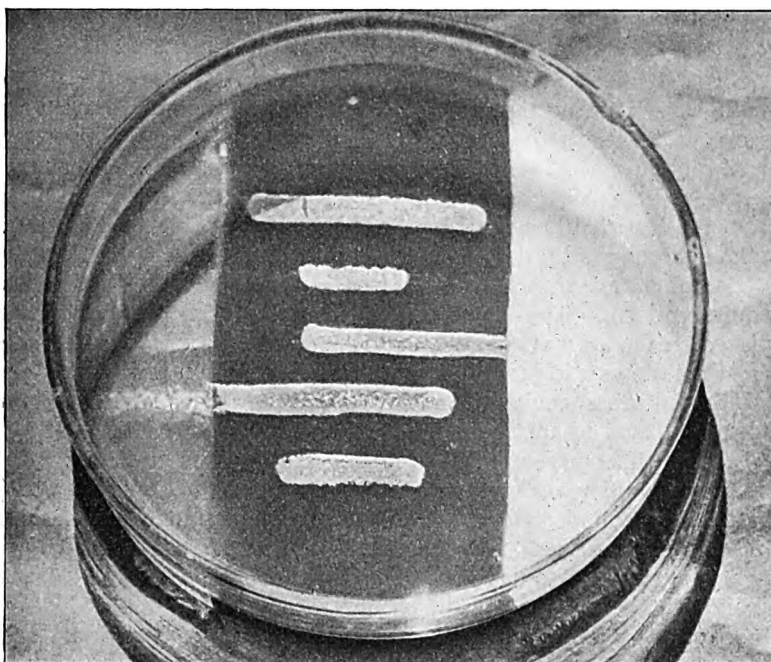


FIG. 2

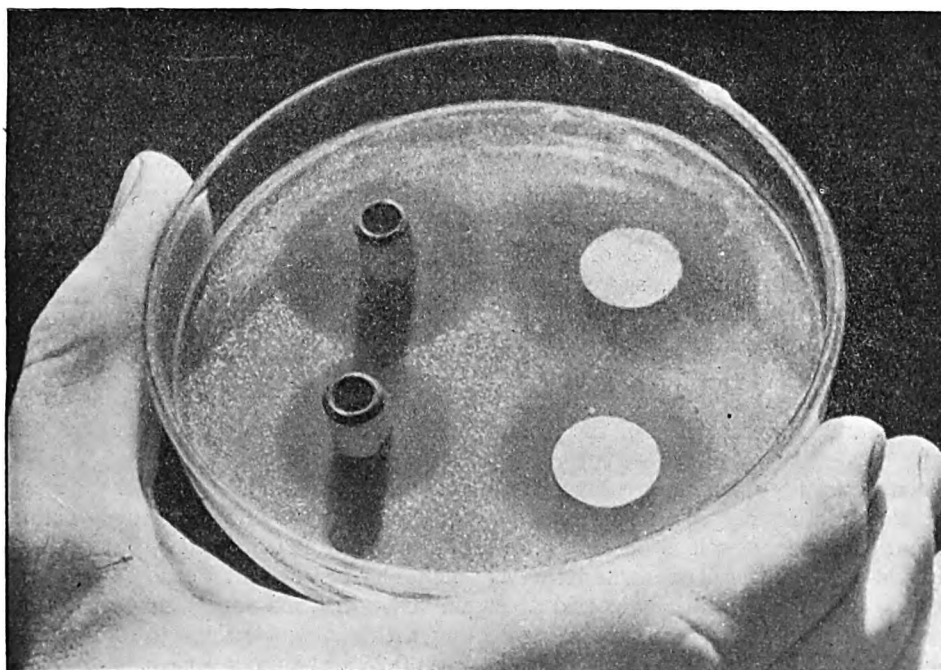


FIG. 3

We have tried out but discarded the Agar cup method (Fleming, 1942) as the results are not as clear cut and it is not possible to test such a large number of organisms on one plate.

#### PENICILLIN ASSAY IN SOLUTION.

Various methods of assaying the penicillin content of solutions have been employed. For relatively large concentrations the best results have been obtained with the Oxford Assay Cup Method (Abraham *et al.*, 1941). Our technique is as follows. Nutrient agar is used, mixed with a twelve-hour *Staph. aureus* broth at 50° C., the proportions being 1 c.c. of a 1 : 10 dilution of broth with 100 c.c. of agar. This has been found to give much more clear-cut readings than the originally described method of pouring the broth over the surface of the agar. It also obviates the necessity for special arrangements of samples on the plates as growth is quite uniform. The sterile cup which is a small porcelain cylinder of standard size is then placed on the agar after preliminary heating to produce a seal, and the test fluid is poured in so that the cup is just filled. Zones of inhibition are read after twelve hours incubation. If the culture is incubated for long periods the zone is found to diminish gradually and isolated colonies begin to appear in the clear zone. The diameter of the zone is always used for the reading. The measurement is taken with dividers against a dark background. In order to obtain uniformity, readings have throughout been read by one of us (G.D.L.).

In place of the assay cylinder, we have used filter paper cut in circles and soaked in the test fluid before placing on the agar. This has been found to be a most satisfactory method. The first reference to it seems to have been by Foster and Woodruff (1943) quoting Dowdy, Vincent and Vincent.

In our hands it has been found that Chardin filter paper gives clearer and somewhat larger zones than other filter papers and various types of blotting paper which were tried out. The diameter of the circle used has been 14 mm., the size of our largest cork borer, which instrument, with its cutting edge sharpened somewhat, has been found to be a very convenient piece of apparatus for making the filter paper circles. We have experimented with all sizes of circles from 7 mm. to 22 mm. in diameter. The smaller sizes fail to demonstrate lower dilutions of penicillin, whilst those larger than 14 mm. do not demonstrate any inhibitory action in solutions weaker than those showing zones with the 14 mm. ring. Using this latter size, solutions containing 0.1 unit of penicillin per c.c. give a small but well defined zone. This concentration we consider to be the lowest which can be detected by this method.

Florey and his collaborators have always recommended the use of four cylinders for each test whilst certain American workers have suggested using two. We have recently adopted the method of setting up one cylinder and one filter paper each time. It has been found that occasionally one or other method may give equivocal results which may be checked in this way. Also, especially if ranges of dilutions are to be observed, the two parallel scales, of cylinder and filter paper, serve as a check the one from the other. It is suggested that in laboratories where Oxford Assay Cylinders are unobtainable the filter paper method provides an accurate and thoroughly reliable alternative.

In our hands the filter paper method gives somewhat more constant readings than the cylinders, but in making a determination, if a standard range of penicillin is set up by both techniques and curves plotted of the results, a reasonably accurate assay can be made (*see graph*).

When performing penicillin estimations by the above methods it is always necessary to put up a standard range using a series of solutions containing a known number of units. In preparing such solutions it is better to use an accurate standard powder, but if that is not obtainable penicillin from the same batch as that under test should be used. It is common knowledge that when solutions exceed a certain strength a maximum zone of inhibition is reached. Therefore it is necessary when dealing with strong solutions to dilute these to a suitable range. The best for normal use is between 0.25 and 5 units per c.c.

When titring urine from patients receiving penicillin therapy, it has been our custom to

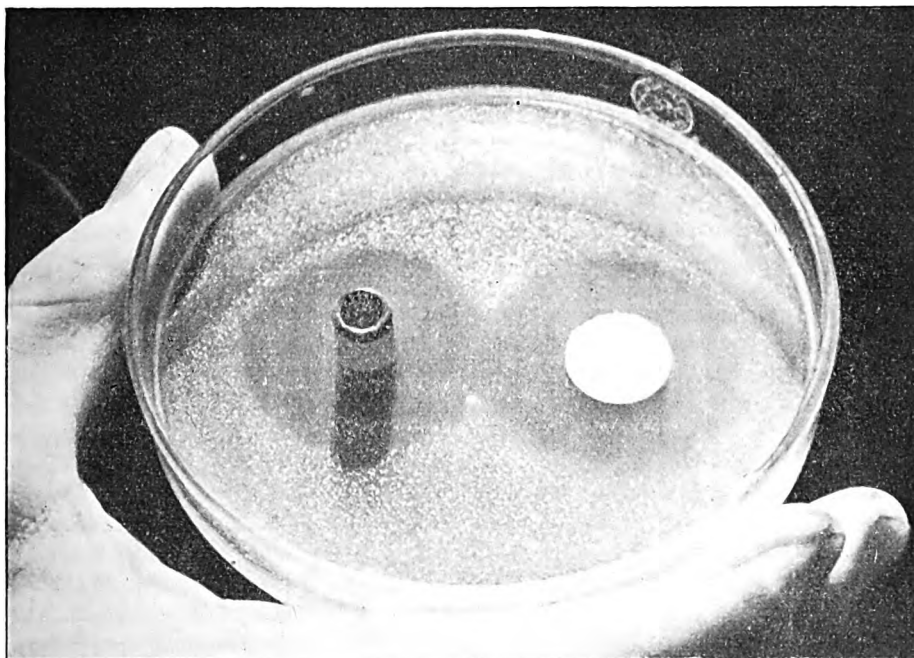


FIG. 4

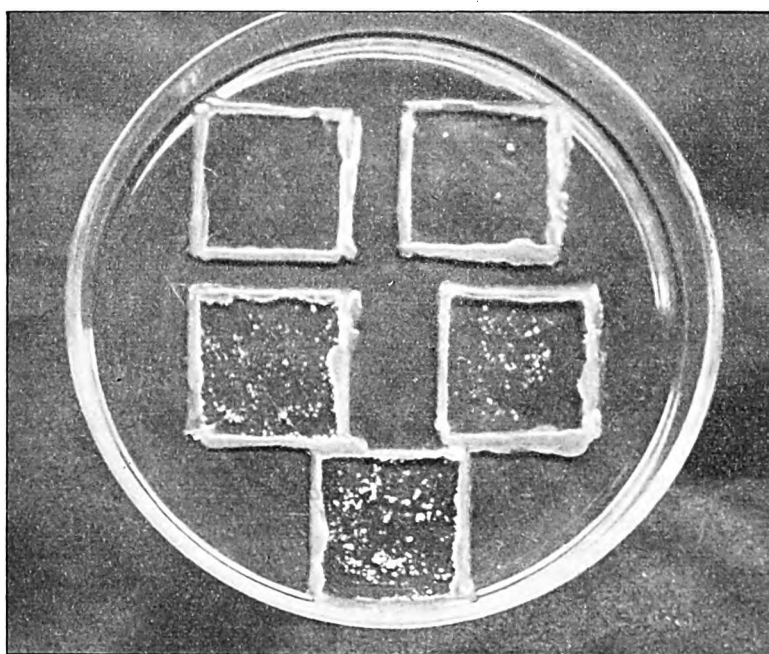


FIG. 5



dilute the specimens 1 : 5, 1 : 10, and 1 : 20—one sample of each dilution being assayed as described above. We have always used as diluent the same type of fluid of a similar pH as that under test or, if this has not been possible, saline of the same pH. If a standard series ranging from 0.25 to 5 units is put up with these one of the dilutions will fall in this scale and the penicillin concentration in the urine can then be calculated. It is considered important to make fresh standard curves for each batch of determinations performed.

In any of the above techniques it has been found that refrigeration of plates after inoculation for three hours before incubation produces more clear-cut results and, at the same time, larger zones.

#### SERIAL DILUTION METHODS OF ASSAY.

Methods of titring dependent on obtaining bacteriostasis of a test organism in a dilution of broth have been tried in many ways. The simplest is to make serial dilutions of the penicillin in broth to which is added a drop of a *Staph. aureus* culture. The dilution in which bacteriostasis occurs gives an end-point. By this method one finds that growth of Oxford

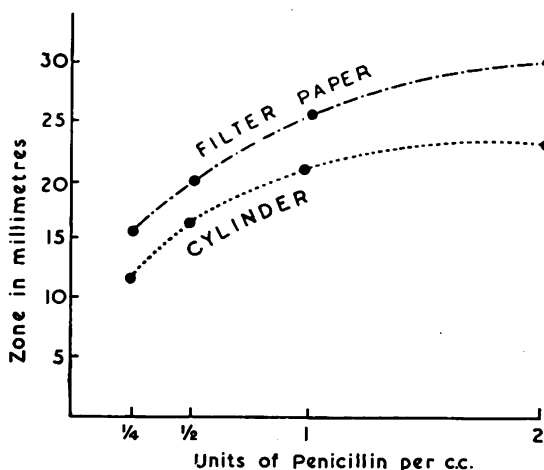


FIG. 6

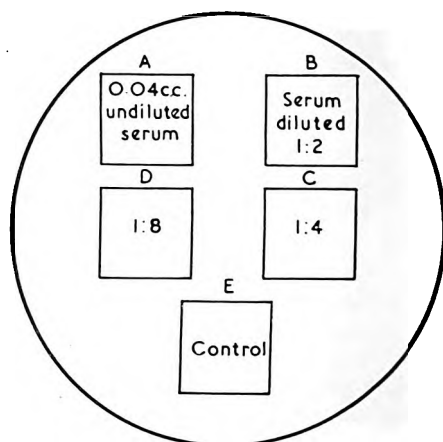


DIAGRAM OF PETRI DISH CELL

FIG. 7

*Staph. aureus* is usually inhibited in the presence of 0.03 unit of penicillin. Any serial dilution method is obviously open to 100 per cent error which can only be reduced by the tedious method of making many intermediate dilutions.

We have attempted many modifications of the dilution method which have proved unsatisfactory—such as the use of indicators for producing end-points; the decolorization of methylene blue. One technique which seemed at first satisfactory but which we have not yet been able to perfect was to make use of the plasma-coagulating power of *Staph. aureus*. Another broth serial dilution method which we have tried is that devised by Rammelkamp (1942) in which he uses a sensitive haemolytic streptococcus as the test organism. We discarded this method as the end-point, depending on presence or absence of haemolysis, was not always easy to read and the method was still open to the objection of 100 per cent error because of the serial dilution.

Whilst attempting to devise a method dependent on the addition of specific volumes rather than serial dilutions, our attention was drawn to a personal communication of Hoogerheide to Foster and Wilker (1943). The modification (described below) of his technique

which we have employed appears to be a most accurate method of penicillin assay. Our routine is as follows :—

#### HOOGERHEIDE'S METHOD (MODIFIED).

220 c.c. of 0.25 per cent glucose broth is inoculated with 22 drops of a six-hour *Staph. Oxford* broth culture. This is then tubed off in 2 c.c. amounts, 22 tubes arranged in two rows of 11 being sufficient for one complete test.

*Method.*—With a micro pipette the following amounts of a standard normal saline solution containing 0.50 units of penicillin per c.c. are added to one row of tubes : 0.10 c.c., 0.09 c.c., 0.07 c.c., 0.065 c.c., 0.06 c.c., 0.055 c.c., 0.05 c.c., 0.04 c.c., 0.035 c.c., 0.03 c.c., the eleventh tube being used as positive control. Similar amounts of the unknown solution are added to the other series, having been previously diluted at a guess to contain also about 0.50 units per c.c. The tubes are incubated for twelve hours, and the end-point is shown, not by the tube with complete inhibition, but in that containing a clear supernatant fluid with sediment.

The method of inoculating the glucose broth seems to be important. In the original method the *Oxford staphylococcus* was added to the 2 c.c. amounts of glucose broth. We found that by adding the *staphylococcus* to the stock broth a more even suspension of the organism was obtained with less chance of contamination.

The most suitable type of tube for this test was found to be  $2\frac{1}{2}$  by  $\frac{1}{2}$  inches.

Better results were obtained by leaving the inoculated broth three hours in the refrigerator before incubation.

The above method was found to be very accurate in the assay of penicillin solutions and urines but it appeared that in the presence of protein-containing fluids, such as serum, some change had occurred which produced inconsistent results.

We therefore discarded this method for serum estimations in favour of the following technique which provides more accurate results.

#### PENICILLIN IN BLOOD.

For titring penicillin in blood various modifications of a slide cell technique have been suggested (Fleming, 1943 ; Colebrook, Storer and Wright, 1923 ; Bigger, Thomas and Caldwell, 1944), and so far this seems to be the best method. It is dependent on showing that a given serum produces bacteriostasis of a test organism—usually *Oxford Staph. aureus*—in certain dilutions.

The modifications we have adopted, which we find infinitely simpler to carry out than any method yet described, is as follows :—

The test is carried out in the bottom of an empty sterile Petri dish.

Four drops of diluent, each of 0.4 c.c., measured with a sterile 0.2 c.c. pipette graduated in 1/1,000th, are placed in the dish in positions B. C. D. E (*see diagram*). One drop (again of 0.04 c.c.) of the test serum is placed at position A and another mixed with drop B. A serial dilution is then made from B to C and then to D, leaving E as a control. One loopful of a twelve-hour broth of *Oxford Staph. aureus* diluted 1 : 1,000 is mixed with each broth. Each one is then covered with a sterile  $\frac{7}{8}$  inch coverslip and vaselined into position. We have found that, using the above quantities with this size of coverslip, an even smear is left without any leakage around the edges. The plate is incubated at 37° C. for twelve hours, at the end of which time the results can be read naked eye or with the aid of a hand lens as—

Complete inhibition = no growth

Partial inhibition = partial growth

or No inhibition = growth equal to that in control

The diluent used in our first experiment was normal human serum and we still feel that this gives a closer approximation to conditions in the body than any other fluid. We have found that if the serum is diluted 1 : 10 to 1 : 100 in saline somewhat higher readings are obtained. Similarly if broth is used the same higher readings result. Using serum or a dilution of serum as diluent small clear-cut colonies are easily visible. With broth, however, there is a greater tendency to turbidity in the drops when growth is occurring and for this

reason we have discarded this method. It may be noted that in mixtures where partial inhibition has occurred, not only are the colonies fewer in number but they are somewhat larger.

Bigger (*Lancet*, 1944) has reported that if serum is allowed to stand, more particularly in the incubator, lower titres will result. He accounts for this as being evidence of inhibition of penicillin by the blood serum and therefore suggests that the diluent should always be serum diluted 1 : 10 and that incubation should never be longer than twelve hours.

We have found that if the Petri dish cells are placed in the refrigerator for three or more hours before incubation there is no appreciable change in the results.

We have tried an identical method using nutrient agar and blood agar instead of the empty plate, but the organisms tend to grow very rapidly and results are difficult to read. It would therefore seem that the most suitable diluent is serum, either diluted 1 : 10, as suggested by Bigger, or used undiluted, which would seem more nearly to approach body conditions.

#### ASSAY IN EXUDATES AND BODY FLUIDS OTHER THAN BLOOD.

The body fluids other than urine and blood which may be assayed to advantage are sputum, pus, wound exudates, blister fluids, pleural fluid, joint fluid and cerebro-spinal fluid. It is interesting to note that whereas, in serum, the penicillin only rises to a concentration which can be detected by the filter paper method for very short periods, i.e. fifteen to thirty minutes after an intramuscular injection, levels which can be detected by such a method are frequently found in pus, sputum, etc., and persist for hours after the penicillin has disappeared from the blood. When dealing with substances of a sticky consistency, such as sputum or pus, we have noticed that the filter paper is the method of choice. It would appear that the composition of the sputum or pus prevents diffusion out of the cup in some cases, whereas this has never occurred when using filter papers.

#### DISCUSSION.

In a normal laboratory the use of three of the above tests can give all the information required regarding a case being treated with penicillin. Thus a swab from a patient who it is felt should be treated with penicillin is tested by means of the gutter plate, and the sensitivity of the organisms together with a factor is determined. It should be emphasized that treatment should be controlled by bacteriological examinations in order to determine when organisms disappear. Pus, urine, sputum, etc., may be tested during treatment by means of assay cylinders and filter papers in order to determine penicillin concentration. Blood serum levels may be obtained using the Petri dish cell technique.

#### SUMMARY.

(1) Modifications of penicillin assay methods used by us in routine investigations are described.

(2) It is considered that an account such as this will prove useful to pathologists carrying out investigations on patients under treatment with the drug.

We wish to express our thanks to Lieutenant-Colonel C. J. Harwood Little, O.B.E., R.A.M.C., the Officer Commanding this Laboratory, for his help throughout this work, and to Colonel H. J. Findlay for permission to forward this paper. We also wish to record our appreciation of the photographic work which was done by Private P. Wood, R.A.M.C.

#### REFERENCES.

- ABRAHAM, E. P., FLETCHER, C. M., FLOREY, H. W., GARDNER, A. D., HEATLEY, N. G., JENNINGS, M. A. (1941). *Lancet*, **2**, 341.  
 BIGGER, J. W. (1944). *Ibid.*, **2**, 400.  
 BIGGER, J. W., THOMAS, G. E., CALDWELL, W. G. D. (1944). *J. Path. Bact.*, **56**, 266.  
 COLEBROOK, L., STORER, E. J., and WRIGHT, A. E. (1923). *Lancet*, **1**, 365.  
 FLEMING, A. (1929). *Brit. J. Exp. Path.*, **10**, 226.  
*Idem.* (1942). *Lancet*, **1**, 732.  
*Idem.* (1943). *Ibid.*, **2**, 434.  
 FOSTER, J. W., and WILKER, B. L. (1943). *J. Bact.*, **46**, 377.  
 FOSTER, J. W., and WOODRUFF, H. B. (1943). *Ibid.*, **46**, 187.  
 PULVERTAFT, R. J. V. (1943). *Lancet*, **2**, 341.  
 RAMMELKAMP, C. H. (1942). *J. Immunol.*, **51**, 95.

THE PROBLEM OF MEASURING PHYSICAL FITNESS FOR HARD WORK :  
A COMPARISON OF A FITNESS TEST WITH A MIXED PERFORMANCE TEST.

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FOR centuries the assessment of physical fitness by simple measurements has been sought. These have comprised anatomical and physiological data in varying degrees of complexity. They began with the anthropometric measurements of the Greek period, but in the present century physiological functional tests have been most widely used.

It is now generally agreed that fitness can only be assessed in terms of some specific activity. Its testing requires a measurement of the physiological aptitude for this activity. This implies some directive qualification of "physical fitness" and necessitates the use of more or less of that activity for its measurement. The most reliable test is obviously a performance in which the physical ability to discharge a task is measured by using that task itself. This is seldom practicable, however, but the results of any accepted test should have a close correlation with the performance it is potentially measuring.

The most accessible physiological measurement is the response of the circulation to effort, most easily and reliably measured as the pulse-rate. Literature abounds in references to this in men in training. During the last decade various aspects are discussed and comprehensive summaries are to be found in such works as those of Steinhaus (1933), Cotton and Dill (1935), Hill, Magee and Major (1937), Abrahams (1939) and Jokl *et al.* (1941). It is generally agreed that of the various simple tests for physical efficiency the rate of cardiac deceleration after intense effort seems the most reliable.

It is understandable that during wartime, when physical fitness is so important, the search for such tests should have continued. So varied are the tasks of the fighting soldier, however, that it is sufficient definition to make the aim the testing of the capacity for any hard and enduring physical work. It is this that the Harvard Pack Test, a recently widely accepted one, sets out to gauge.

In this, the pulse deceleration rate is measured after moderately heavy standard exercise. Briefly, it consists of stepping, every two seconds for five minutes, on to a 16-in. high platform ; a pack weighing approximately one-third of the body-weight is carried on the back ; the hands, shoulder width apart, are kept grasping a horizontal bar at shoulder height. Immediately at the end of this time, or earlier if the rate of stepping lags for more than twenty seconds, the subject sits while the pack is removed. The pulse is measured in half-minute periods, 1-1½ minutes, 2-2½ minutes and 4-4½ minutes after cessation. The index of fitness is calculated as

$$\frac{\text{Duration of Exercise in Seconds} \times 100}{\text{Twice the Sum of these half-minute Pulses}}$$

Figures for poor, average, good and superior fitness in normally healthy men are laid down.

At this Army School the test was tried out against a hard mixed performance test ; the results of the Fitness Index (F.I.) are compared with the Performance Test (P.T.). Special care was taken to eliminate possible variables by the time allocation of the two tests.

## METHOD.

It seemed that three main groups should be taken for this comparison.

(1) Highly trained men in a presumably steady state of fitness. These existed in the persons of the permanent staff instructors of the A.S.P.T. Eleven instructors were used in this group.

(2) Moderately trained men whose general fitness for work should improve with further training. These existed in the persons of War Course N.C.O.s training for promotion to the A.P.T.C. On these, in addition to the direct correlation between F.I. and P.T., the variation of both over the last four weeks of their course was charted. In fact, the F.I. was recorded three times as compared with the P.T. twice. The results give an interesting criticism of the Pack Test technique. Twelve men were followed over this one month's trials.

(3) Initially unfit men on whom the Pack Test might serve as a prognostic test. These do not exist at the A.S.P.T. With this group it would be important to know : (a) how many men of low F.I. are trainable to A.I. on performance ; and (b) how many men of high F.I. become poor performers and subsequently break down in routine unit training.

It is hoped that this may later be done.

## DETAILS OF TESTS.

The Pack Test was carried out strictly in conformity with the details as laid down by the originators.

The Performance Test was designed to try out to their limits the main systems of the body in all-round trials of physiological value and military interest. It was in three parts with no intervening rest periods. The whole performance was over within one hour. It consisted of a four miles run, a two hundred yards carry of a man of similar weight and equipment, and a double ascent of a vertical 15-foot rope. All were done in full battle order.

Marks were awarded mainly on length of time taken in the different parts. This was regarded as the most important single criterion capable of exact measurement ; but note was taken of other less easily recorded objective phenomena, such as breathlessness, technique, and degree of effort.

Subjective symptoms were investigated after both tests. Though these were not taken into account in the figures used, helpful information was obtained.

Considered physiologically, this performance test seemed to try out most body systems to the full. The run, in addition to working the large muscle groups in the legs and back, was regarded as a severe test of the cardiovascular and respiratory systems. The carry embraced these, as well as bringing in the large muscle groups of arms and back in an exercise mainly of strength. The rope climbing was more of a trained skill. In addition to the smaller muscles of hand and forearm, it involved the leg and back muscles in practised movements. It forms a usual part of the training at this school and therefore was capable of measurable improvement. This improvement is a reflection of the training of the central nervous system in the execution of skilled movements.

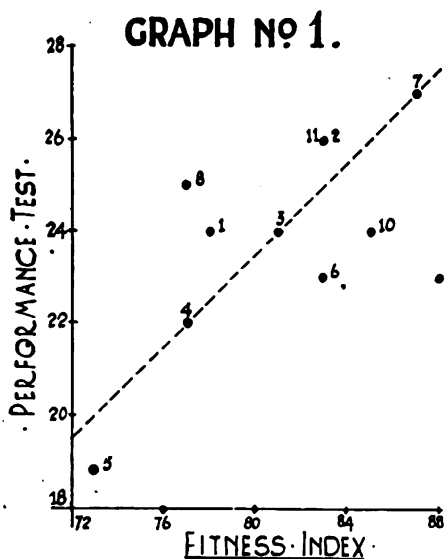
## RESULTS.

(1) The results of the first group are shown in Table I.

TABLE I.

				<i>Fitness Index (F.I.)</i>	<i>Performance Test (P.T.)</i>
(1)	C.S.M.I. E.	..	..	78	24
(2)	C.S.M.I. S.	..	..	83	26
(3)	C.S.M.I. D.	..	..	81	24
(4)	C.S.M.I. B.	..	..	77	22
(5)	C.S.M.I. E.	..	..	73	19
(6)	C.S.M.I. L.	..	..	83	23
(7)	Q.M.S.I. N.	..	..	87	27
(8)	Q.M.S.I. R.	..	..	77	25
(9)	Q.M.S.I. McN.	..	..	88	23
(10)	Q.M.S.I. C.	..	..	85	24
(11)	Q.M.S.I. S.	..	..	83	26

These figures have been plotted and are best considered graphically (Graph 1).



The scatter of the plotted points round the mean line appears to be fairly high. This indicates only a moderate correlation between the Pack and the Performance Tests. Of the four points above and the four below this line, only one on either side shows a marked discrepancy.

Of these, one (8) had a P.T. of 25, considerably higher than his F.I. of 77 would have led us to expect. This fourth highest score was gained by good all-round performances, especially in the run where he finished first. Inquiry showed that he felt "off colour" in the morning's Pack Test and could not concentrate on the timing. He felt equally tired during the afternoon performance but, as he was keen on doing well in the test, scored highly in all three parts. Here, determination conquered indisposition.

The other main divergent (9) had a poor P.T. of 23 compared with his F.I. of 88, the highest registered. He did poorly in the run but better in the carry and ropes. Thus, his endurance work was poorer than his accomplishment of skilled movement.

Of the remaining nine, little comment is needed. Only two, one at either end, merit special note. These are (5) and (7). Both fit well into the line of the graph. The former, just returned from leave, said he was far from fit; the latter thought himself very fit, and both types of test came equally easy to him. Both thought the Pack Test fairly represented their fitness for performance.

(2) The results of the second group of men, extended over a period of one month, are best considered under four heads. These are :—

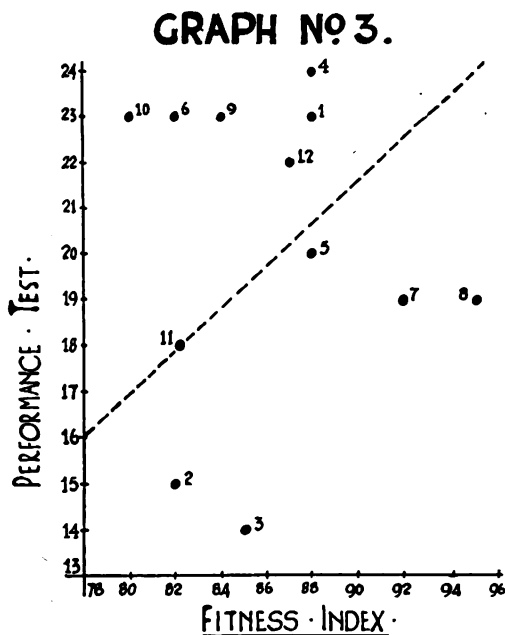
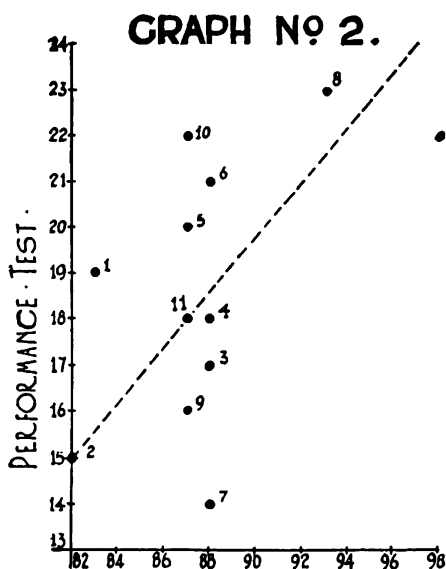
- (a) The correlations between the Fitness Index and the Performance Test (i) at the beginning, and (ii) at the end of the month, as already similarly done for the first group.
- (b) The changes in value obtained for the F.I. during this month.
- (c) The changes in value obtained for the P.T. over this period.
- (d) The relation between (b) and (c).

The figures obtained and used in the relevant graphs (2 to 5) are shown in Table II.

TABLE II.

			Nov. 24-25		Dec. 4		Dec. 22-23	
			F.I.	P.T.	F.I.	F.I.	P.T.	
(1)	Cpl. S.	..	83	19	83	88	23	
(2)	Bdr. G...	..	82	15	79	82	15	
(3)	Cpl. B...	..	88	17	61	85	14	
(4)	Cpl. C.	..	88	18	80	88	24	
(5)	Cpl. W.	..	87	20	87	88	20	
(6)	Bdr. B...	..	88	21	77	82	23	
(7)	Bdr. D.	..	88	14	92	92	19	
(8)	Cpl. T...	..	93	23	89	95	19	
(9)	L/B. B...	..	87	16	86	84	23	
(10)	Cpl. B...	..	87	22	79	80	23	
(11)	Sjt. C...	..	87	18	83	82	18	
(12)	Sjt. C...	..	98	22	88	87	22	

(a) The correlations between the F.I. and P.T. on the two dates are shown in Graphs 2 and 3.



(i) Graph 2 shows approximately the same scatter as did the first group (Graph 1). The only two meriting comment are (7) and (10).

The former, with F.I. of 88, would have been expected to give a higher P.T. than 14. That he was short of endurance work was shown by his low score being due mainly to poor time in the four-mile run. In this he was the slowest. In the other two tests he was up to standard.

The latter (10) had a lower F.I. of 87 with an abnormally high P.T. of 22. He was older and stronger, and did well on the endurance work, being placed second equal in the run.

(ii) The second recording (Graph 3) shows a wider scatter. Here, too, the six main divergents might be considered.

One (3) had a lower P.T. of 14 than would be expected from his F.I. of 85. In the latter he felt "better than ever before" but in the former he scored badly in all three parts and was obviously tired. The Pack Test did not try him out enough to show this up. His rather anomalous case is further considered under (b) (i) and (ii).

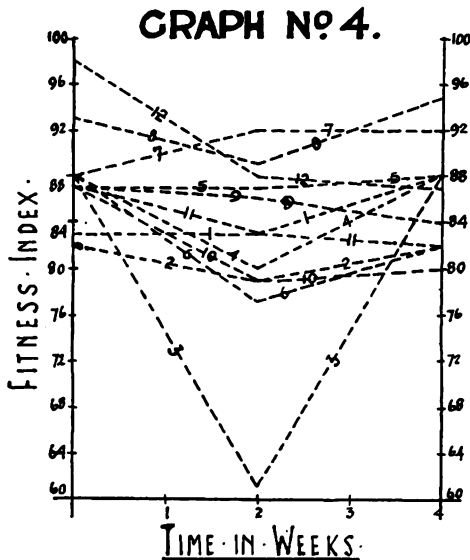
Another (8) had the highest F.I. of 95, but was fourth lowest in the P.T. at 19. During the morning Pack Test his exuberant fitness had been especially noted. During the afternoon

performance he looked weary and ill. Inquiry showed that he had strained an abdominal muscle two days previously. Though this had not inconvenienced him in the Pack Test, it had handicapped him in the performances. Yet he considered himself much fitter than a month before. In his case, the Pack Test was a good trial of his cardiovascular fitness for hard work, but it did not show the effect of the localized lesion.

A third (6) had a high P.T. of 23 compared with his rather low F.I. of 82. He thought his Pack Test was very easy, as he was obviously not concentrating on it, and did correspondingly poorly. On the other hand, though he found the performance "fairly hard and tough," he did well in all parts, especially endurance work. He was a top-scorer in the run. Over the last month his fitness had improved greatly by performance, but not by the test result.

Three others, (2), (7) and (10), diverged widely, but investigation of results and full inquiries threw no light on the causes. To (10) the same remarks apply as were made in the previous section (a) (i).

(b) The Pack Test was carried out not only at the beginning and at the end of the four-week period in conjunction with the Performance Test, but also intermediately at two weeks without any performances for comparison. The results are shown in Graph 4 and will be discussed in their two main parts.



(i) Over the first two weeks one very significant fact stands out. With the one exception of (7), the second readings show either no change, as in (5) and (1), or else a definite decrease.

In the first recordings of the Pack Test it was noted that, in spite of being told to straighten knees and back fully, there was no uniformity in this. When the test was repeated a fortnight later, orders were given that the *position of attention* was to be taken each time on the top of the bench. This makes the test more severe, and it is believed that this tightening of the technique was the main factor in the fall of the readings.

The two cases with the most marked decrease are (3) and (12). They will be considered separately.

It was particularly noted on the first test that (12) did not straighten his knees fully. His F.I. fell from 98 to 88 in the fortnight. Even after this, in the next fortnight he showed a further slight drop to 87, concomitant with a little further improvement in his straightening.

The drop of F.I. from 88 to 61 in the case of (3) was mainly due to his inability to keep to the required pace the second time; as he was too exhausted to keep the correct step, he was



halted after four minutes instead of the usual five. On inquiry he had been feeling "off colour for some days." Physical examination showed nothing in any system. His recording was a good indication of his fitness *that day* for hard physical work.

The others all thought themselves fitter than the fortnight before and presumed they had improved their test results. Their decreased readings almost certainly reflected the tightening of the technique.

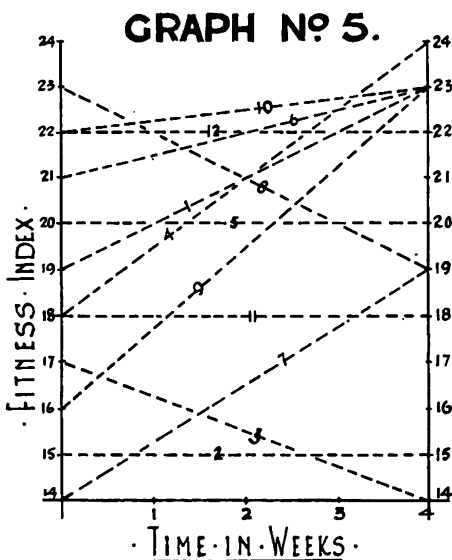
(ii) The third reading of the F.I. showed in most cases a marked increase. It is believed that the second half of the graph is a more accurate indication of their true F.I. progress. The first half might well be ignored when comparing with performance.

The most striking increase was recorded by (3) who rose from 61 to 85. He was once again feeling fit and, as far as this test could show, had recovered from his temporary indisposition (cf. (a) (ii) and (c)).

One, (7), showed no change, his F.I. remaining level at 92. On inquiry he "felt about the same" in his last two Pack Tests; but his body straightening had improved all through.

The only marked fall in this fortnight was shown by (9). His variation in F.I. through the month was only 87, 86 and 84. Though he maintained that he was fitter and stronger, he could not understand why the Pack Test felt harder finally than initially. His leg and back straightening had improved as his test score dropped.

(c) Only two recordings were made of the more time-consuming performance tests, at the beginning and at the end of the month's training. The results are shown in Graph 5.



Of the twelve men, six showed variable but definite improvement, four were stationary while two declined.

The first followed the expected course. Their improvement was not only objective by the test, but also subjective by their feelings; they all felt fitter and performed more easily.

The stationary four had nothing subjective to add to their recorded results. They thought themselves little changed by the month's training.

Of the remaining two, one (3) "felt tired on the run" and "had no strength in the carry or ropes." He was definitely "not as fit as a month ago." It is probable that this was the aftermath of the indisposition mentioned earlier ( (a) (ii) and (b) (i) ) and recorded in Graph 4. It is well shown in the change of his position from Graph 2 to Graph 3.

The other, (8), dropped from the original high recording of 23 to the fourth lowest of 19. This was accounted for by the abdominal muscle strain already mentioned ( *(a)* (ii) ).

(*d*) When the Fitness Indices and Performance Tests (Graphs 4 and 5) are considered together in the light of the previous remarks, particularly remembering that only the second half of Graph IV has for the majority any real significance, the correlation between the two is moderately close. Of the twelve, six may be said to show good correlation, two fair and three poor. That of the twelfth, (3), is a little equivocal but after all allowances are made might best be included as fair. This case has already been discussed, especially under ( *(b)* (i) ).

The first eight call for no particular comment. It was the result to be expected. Except in the cases of (2) and (12), where the agreement is only fair, there is a striking parallelism between the two sets of lines. This denotes good agreement in the fitness progress as measured by the two types of tests. The three main divergents, however, merit closer consideration.

Though (7) remained level at 92 in the latter half of his F.I. graph, his P.T. rose steeply from 14 to 19. He himself noticed little difference in difficulty in the Pack Test but felt much easier in his second performance than in the first. Especially in his endurance work he considered himself much fitter. The failure of the Pack Test to show this adequately was probably due to the tightening of the test technique (cf. *(b)* (ii) ).

The other, (8), has already been discussed under (*a*) (ii) and (*c*). His second performance suffered from the discomfort of his abdominal muscle strain. The Pack Test did not show this in his F.I. results.

In spite of having the most marked rise of all from 16 to 23 in his P.T., (9) showed a slight drop in F.I. from 87 to 84. He thought the Pack Test harder the last time than previously, and it is considered that in the two earlier tests he was not straightening fully. On the other hand, he felt easier in the second performance, especially in the run. In civil life he was a professional footballer. He was always short of endurance work and was very tired at the end of a long, hard game. In this he admitted great improvement after the month's training. His discrepancy appeared due mainly to his improved technique in the test, but also a little to its not being hard enough to show his increased endurance (cf. *(b)* (ii) ).

#### SUMMARY OF RESULTS.

(1) A fair correlation existed between the Fitness Index and the Performance Test. In the small series of the eleven men chosen for their known all-round physical fitness, only two showed marked discrepancies. Failure of the Pack Test to forecast lack of endurance or to show interest and concentration seemed the main factors in these.

(2) (*a*) In a series of twelve men of moderate fitness, rather less correlation was shown to exist, especially when the double test was repeated after a month's intensive training. At the beginning only three showed marked divergence; endurance seemed the main factor in two of these. At the end, six gave results well away from the mean. To the physical and mental factors, already shown as its main deficiencies, might be added the failure of the Pack Test to disclose a local lesion.

(*b*) The results of the Pack Test were shown to be very largely altered by its application. The figures can to a great extent be falsified by poor technique. The effect of a temporary general indisposition was well shown, but recovery as recorded by this test was more complete than by performance.

(*c*) The Performance Test results were in keeping both with the known fitness of the subjects and with their feelings. They gave a good basis for comparison, and showed up the full effects on all-round performance of such things as a localized lesion and a previous indisposition.

(*d*) When the progress of the Fitness and of the Performance Tests was followed over one month's training and a comparison made, 50 per cent showed good correlation, 25 per cent fair and 25 per cent poor. In two of the last three, one factor which did not seem to be adequately recorded by the Pack Test was endurance. This was better tested as the technique

was tightened. The third was affected by the local abdominal lesion. Though the numbers taken are not enough to be significant statistically, they throw some doubt on the reliability of this test.

(3) Until a series of initially unfit men can be similarly tested over a long period, the prognostic value of the Pack Test must be uncertain.

#### CONCLUSIONS.

The Harvard Pack Test is of limited value in the testing of physical fitness for hard work. *Stringently applied* it is a good test for the response of the cardiovascular system to work of a not too exhausting nature. It cannot be regarded as a sufficiently hard test for real endurance work for fit men. Its prognostic value is uncertain.

Its discrepancies with performance appear to be caused mainly by the failure to attain technical perfection in its execution. This latter requires careful observation even by a trained observer. Only then is it hard enough to test endurance fully.

It is possibly the best cardiovascular test yet developed, but it is very debatable whether this system, though the most easily measured and recorded, is really the most important in assessing actual or potential fitness. It is certainly not the main limiting factor in training healthy men, where the central nervous system, the endocrine system and the mental volitional factors are more important. A reliable fitness test should include their assessment. It has always been difficult to find any test other than hard performance for such a specific thing as fitness.

#### ACKNOWLEDGMENTS.

I wish to thank the Commandant, A.S.P.T., for permission both to carry out the tests and to forward this paper, as well as those members of the Staff and the Corps who co-operated so willingly.

#### REFERENCES.

- ABRAHAM, A. (1939). *Lancet*, ii, 309.  
COTTON, F. S., and DILL, D. B. (1935). *Amer. J. Physio.*, 3, 554.  
HILL, A. BRADFORD, MAGEE, H. E., and MAJOR, E. (1937). *Lancet*, ii, 441.  
JOKL, E., CLUVER, E. H., GOEDVOLK, C., and DE JONGH, T. W. (1941). "Training and Efficiency," South African Institute for Medical Research.  
STEINHAUS, A. H. (1933). *Physiol. Rev.*, 13, 103.

## CEREBRAL MALARIA.

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[Received April 17, 1945.]

IN this hospital, which was situated in one of the highly malarious areas, in 1943, we saw a great deal of malaria. In the Indian wing there were 29,630 patients admitted with malaria; and of them 119 died; the mortality varying from 19.6 per 1,000 in January, 1943, to 1.1 per 1,000 in December, 1943. In the British wing there were 733 cases of malaria admitted, of whom one died, giving a mortality of 1.3 per 1,000. All our fatalities were submitted to autopsy so that the final diagnosis was proven in every case.

For this paper I have analysed the data of the last half of 1943, when there were 22,041 cases of malaria admitted to the Indian wing (Table A). These were *P. falciparum*, 38 per cent, *P. vivax*, 61.8 per cent, and *P. malariae* infection, 0.2 per cent. There were 67 deaths due to malaria giving the mortality of 3 per 1,000. Of these fatalities, all except seven (cardiac, five; malarial anæmia, two) died of cerebral malaria. Thus the mortality of malignant tertian (8,375) due to cerebral malaria was 7.1 per 1,000. The proportion of malaria patients who develop cerebral malaria cannot be definitely stated, as different observers differ in their views as to what are the limits which demark a patient being considered in the cerebral state. But the study of the malaria patients who warranted admission to the seriously ill ward of the hospital may give some idea of the proportion of malaria patients requiring special attention. Table A shows that out of the 22,041 patients, 936 (4.2 per cent) were in the seriously ill ward, and the proportion varied from 8 per cent to 2.4 per cent in different months. In the seriously ill ward of the hospital, 67 patients died of malaria, giving the mortality rate of 65 per 1,000 of seriously ill malaria patients.

TABLE A.

		Total malaria admissions	Malaria deaths	Mortality per 1,000	Malaria admitted S.I. ward	% of total malaria admitted S.I. ward	Mortality per 1,000 of malaria admitted S.I. ward
1943							
July ..	..	2,899	16	5.5	216	7.2	74.0
August ..	..	2,473	12	4.8	199	8.0	65.3
September ..	..	3,539	9	2.5	135	3.8	66.6
October ..	..	6,261	15	2.4	175	2.7	85.7
November ..	..	4,233	12	2.8	146	3.4	82.1
December ..	..	2,636	3	1.1	65	2.4	46.1
Total		22,041	67	3.0	936	4.2	65.0

DIAGNOSIS.—Diagnosis of cerebral malaria is not always easy as a patient may have none of the symptoms and signs so well recognized in malaria. There may be no history available, as is often the case in the field and, even if there is a history, it may have no record of shivering or rigor; the temperature may be normal or continuously high; the spleen may not be palpable; the patient may have become suddenly unconscious while on duty or while on routine malaria treatment, or have been ill or even unconscious for several days. The serial blood slides may be negative for malarial parasites. Out of 936 cases in the seriously ill ward, 30 patients gave repeated negative blood slides for malarial parasites, and of these, 6, who died, showed on autopsy sporulating forms of malarial parasites in the brain capillaries, though, generally, slides if taken four to six hourly give positive results and usually there is a heavy infection.

In this series of 936 patients in the S.I. ward, 225 showed heavy M.T. infection and 320 very heavy infection. But the extent of infection in the peripheral blood is no guide as to the severity of the cerebral state or its prognosis. The temperature gives no clue to the condition and we have seen cases with no pyrexia. Not one of the cases in this hospital had a temperature above 106° F., which is in contrast to heat hyperpyrexia. Clouding of consciousness is the most constant sign of cerebral malaria and the changes in the level of consciousness provide the most delicate index of improvement or of retrogression. The respiratory rate is also a valuable guide as to the severity and the length of the disease and final outcome. From the viewpoint of diagnosis and prognosis, cerebral malaria may be recognized in four stages. These stages are by no means rigid but purely arbitrary and one stage may very quickly pass into the other.

In the first stage the patient is apathetic, dull, drowsy and confused. He shows photophobia and has his eyes closed. He is unco-operative and resents being examined. This has led to suggested diagnoses of heat exhaustion, latent uræmia, etc.

In the second stage he has lost orientation and is semiconscious. His eyes are tightly closed and he is generally restless, often showing purposeless movements of his limbs or face. He is difficult to examine. He shows early signs of meningismus. This has sometimes led to a diagnosis of heat hyperpyrexia, meningitis or hysteria.

In the third stage he shows complete loss of consciousness and is either delirious or comatose. There may be twitching of the face which may become generalized leading to epileptiform convulsions. He has all the signs of meningitis and may exhibit board-like rigidity of the neck and even of the whole body. In this stage the diagnosis has been confused with uræmia, status epilepticus and meningitis.

In the last stage he shows signs of deep unconsciousness and has stertorous breathing, frothing at the mouth and, like the deeply anæsthetized patient, may swallow his tongue. He often develops coarse moist sounds in the lung bases which may suggest pneumonia or intracranial hæmorrhage.

In some cases hiccup has been an early symptom and in four cases I have seen spontaneous sub-conjunctival hæmorrhage.

The division of the cerebral malaria picture into four stages is rough and ready but it has been of use as a guide to severity and prognosis. The first stage is the easiest to treat and the patient should always recover with prompt treatment. The second stage offers good prognosis but the risk lies in the third stage, while in the last stage the prognosis is bad.

As meningitis must be excluded, lumbar puncture is essential. In all our cases of cerebral malaria lumbar puncture was done as a routine and the C.S.F. was generally found to be under tension. The pathologist, Lieutenant P. R. Pack, I.A.M.C., reported the C.S.F. to be normal chemically, microscopically and culturally. In 58 consecutive cases of cerebral malaria the C.S.F. was under tension in 30 (79 per cent).

C.S.F. pressure				Number of patients
	50-150 mm.	..	..	6
"	below 50 mm.	..	..	2
"	over 150 mm.	..	..	30
"	" 200 mm.	..	..	15
"	" 300 mm.	..	..	5

To get over the difficulties of diagnosis the following scheme was developed in this hospital for quick investigation and treatment. This has been followed as a routine in every case of suspected cerebral malaria admitted and may be partly responsible for the fall in mortality rate from January to December.

- (1) Take blood slide for malarial parasites.
- (2) Catheterize and test urine.
- (3) Do lumbar puncture.
- (4) Give quinine gr. 6 intravenously.

This regime eliminates most of the snags and ensures prompt treatment. It is the speed of the treatment that is all-important. In this series of 67 deaths, 48 (71 per cent) died within

twenty-four hours of admission and of these 34 died within twelve hours and 12 within six hours of admission.

The blood sedimentation rate was seen to be increased in most of the cases. In 32 consecutive cases all except two showed increased blood sedimentation by Westergren's method. The figures (uncorrected for anæmia) are as follows :—

1- 4 mm. in 1st hour..	..	..	..	..	2 patients
5- 20	..	..	..	..	14 "
21- 40	..	..	..	..	4 "
41- 60	..	..	..	..	6 "
61- 80	..	..	..	..	1 "
81-100	..	..	..	..	4 "
101-120	..	..	..	..	1 "

The blood-pressure remained fairly constant till the very end and no significant variation was found in urine chlorides, but gross anæmia develops very rapidly in all malignant tertian cases.

**PATHOLOGY.**—I have had an opportunity to conduct post-mortems on over 150 malaria patients (the records of which will be published separately), but in this series 70 cases of cerebral malaria, all of whom were young Indians between 19 and 38 years, may be summarized here. There were four Indian Other Ranks, 7 Followers, 13 Civilian Labourers and 46 men of Indian State Labour Forces. 35 of them were well nourished, 14 poorly nourished and 11 greatly emaciated when they came to the post-mortem table.

The spleen was above the normal size in all and the average size was six times the normal ; the biggest spleen being 12 times the normal size and in all except four cases the spleen was more than four times normal size. The spleen was dark slate colour and soft in consistency. On cutting it showed dark soft tarry pulp which resembled in appearance blackcurrant jam. It was often so soft and defluent that it could be washed away with a gentle stream of water. The spleen smear showed abundant malarial pigment and malarial parasites. The liver usually showed no microscopic change, though in four chronic cases it was of slate hue and moderately enlarged. In two cases there was generalized hæmorrhage from the mucosa of the gastro-intestinal tract. Kidneys, suprarenals and pancreas showed no macroscopic change. The brain was in all cases congested and pia-arachnoid blood-vessels were engorged. In six cases there was subarachnoid hæmorrhage in the form of scattered patches over the dorsal surface of the vertex about the size of a shilling piece. On cutting, the white matter showed punctiform hæmorrhages and the grey matter was of darker slate colour than usual. The brain smear stained with Leishman's stain showed malarial pigment and sporulating forms of malarial parasites.

Major L. Kriner, R.A.M.C., has recently sectioned ten of these brains. He found, in the cortex, hyperæmic congestion ; perivascular hæmorrhages around large blood-vessels ; œdema of the brain ; swelling of axis cylinders ; white cells packed in some of the larger veins with numerous monocytes as the predominating cells, some of the monocytes being heavily pigmented with malarial pigment ; blood pigment in the perivascular spaces ; pigmented parasites in the cortex, cortical veins, capillaries and subcortical vessels ; malarial parasites in the meningeal veins, and occasionally small clumps of malarial pigment in capillaries. In the cerebellum the meningeal veins were engorged and there were occasional monocytes filled with brown malarial pigment and malarial parasites.

**TREATMENT.**—We have tried several methods of treatment, but the difficulties of such experiments in a very busy hospital in the field are numerous, and the impossibility of selecting cases of equal severity and duration made this study difficult, so my results are nothing more than my opinions. The thing that stands out is that the malarial parasites are present in the blood for several days, even in spite of massive intravenous quinine therapy. Are these parasites resisting the onslaught of quinine and mepacrine or are these parasites dead but still crowding the blood channels ? If the first is the case, we need some more potent anti-parasitic drugs ; if it is the second, we need some drugs that will wash away these para-

sites as well as the clumps of malaria pigment seen in the brain blood channels. We treated our cases with the following methods :—

- (1) Quinine bihydrochloride gr. 6 intravenously every six hours.
- (2) Quinine bihydrochloride by the intravenous slow drip saline method.
- (3) Quinine bihydrochloride gr. 6 intravenously every six hours and 20 c.cm. of 50 per cent glucose and 5 per cent saline solution intravenously.
- (4) Methyl-sulphonate-mepacrine 0.25 gramme intramuscularly every six hours.
- (5) Methyl-sulphonate-mepacrine 0.25 gramme intramuscularly every six hours and 20 c.cm. of 50 per cent glucose and 5 per cent saline solution intravenously.

As Bass put forward, quinine bihydrochloride 2.0 grammes in the blood of a person weighing 150 pounds killed *P. falciparum* in five to twenty-nine hours ; the old standby for malaria, quinine, given every six hours by intravenous route, has been the mainstay of treatment of cerebral malaria. It is stated that the high concentration of quinine causes depression of the heart as has been shown by the weakening of a frog's heart in 1 : 50,000 solution and its failure in diastole in 1 : 5,000 in a few minutes. Chopra states that intravenous quinine in high doses has a depressing effect on the respiratory centre and, in the last stages of cerebral malaria, respiratory centres appeared to be harassed, so care is required in assessing the doses of quinine. It may be mentioned that the undue fear of intravenous quinine is absolutely unwarranted. In this hospital in the past year over 10,000 injections of quinine have been given intravenously by many medical officers with no ill-effect except one abscess of the arm which recovered very quickly.

In cerebral malaria, as there is usually raised intracranial pressure (as seen by increased tension of C.S.F. and œdema of the brain on autopsy), the use of hypertonic saline intravenously has been tried in the hope of reducing pressure. Hypertonic glucose saline may also increase the diffusion of the quinine that passes in the C.S.F. (in 7 cases quinine was detected in the C.S.F. half an hour after intravenous injection of quinine gr. 6) as the diffusion of ferrocyanide and iron ammonium citrate introduced into the cisterna magna by Foley was increased by intravenous hypertonic saline. Thirdly, glucose may also act as the buffer substance against the depressive effect of quinine on the body and, more especially, the heart.

The use of adrenaline was tried in a few cases on the supposition that it raises the blood-pressure which tends to open up the muscle vessels and may also perhaps dilate the cerebral vessels. Adrenaline may also help by increasing blood sugar, and this indirectly produces the effect of glucose given intravenously.

**MEPACRINE.**—For the treatment of malignant malaria the Malaria Commission of the League of Nations pointed out that atebrine (mepacrine) is much more effective than quinine. A trial has been given to methyl-sulphonate-mepacrine and results have been encouraging. The great advantage of methyl-sulphonate-mepacrine over quinine appears to be in the third and fourth stages and especially in collapsed, debilitated, or anæmic patients. In my series of 85 cases of cerebral malaria, treated with methyl-sulphonate-mepacrine 0.25 gramme, given intramuscularly in the upper and outer quadrant of the buttock every six hours, there were only four deaths. Greater trials of this method are advised.

Besides the specific treatment against malarial parasites, general nursing of the cerebral malaria patient is very important. The patient has to be carefully watched, as he may quickly pass into the state of complete unconsciousness and choke himself with his tongue. In that extreme stage one of the essential things is to nurse the patient with his face turned to one side so that he does not swallow his tongue. Another point worth considering is to help the patient to combat the failure of the respiratory centre by putting him in a position in which his accessory muscles of respiration may act to the best advantage. These patients may remain unconscious for quite a time, and the developing anæmia is also often a serious danger, so the nutrition of the patient, especially as regards the fluid and salt intake, needs special consideration. The patient in the second stage onwards needs regular nasal feeds.

## SUMMARY.

A study of 22,041 cases of malaria with 60 deaths due to cerebral malaria is given and difficulties in diagnosis and treatment of cerebral malaria are discussed and the picture of cerebral malaria described in four stages. The pathology of 60 cases is recorded. Different methods of treatment are discussed and the use of methyl-sulphonate-mepacrine is advised.

I am sincerely grateful to Lieutenant-Colonel M. H. Shah, I.A.M.C., O.C. Medical Division, for his guidance and generous help in this study. My thanks are also due to Colonel Ian S. W. Hill, Lieutenant-Colonel F. Ayrey, R.A.M.C., and Lieutenant-Colonel E. D. Mackworth, I.A.M.C., for their encouragement; to Lieutenant Ramakant, I.A.M.C., for his unfailing co-operation while in charge of S.I. Ward and in collecting records; to Major L. Kriner, R.A.M.C., for his report on brain sections and to Lieutenant P. R. Pack, I.A.M.C., for reports on C.S.F. examination.

## REFERENCES.

BASS. As quoted in Chopra's "Pharmacology."

CHOPRA. "Pharmacology."

FOLEY. As quoted in "Applied Physiology," by Sampson Wright.



# TREATMENT OF PERNICIOUS MALARIA (COMA) BY NICOTINIC ACID AND ITS AMIDE.

By Captain B. S. DHILLON,

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AND

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[Received April 27, 1945.]

RECENTLY two cases of pernicious malaria (coma) came under our care. One of these cases was treated with an intravenous injection of quinine bihydrochloride together with a massive dose of nikethamide (an amide of nicotinic acid). The second case was given intravenous quinine bihydrochloride with nicotinic acid.

*Case 1.*—A Mohamedan, aged 30, was admitted on November 27, 1944, with multiple bomb wounds (mine) on both legs and superficial abrasions on the right forehead. These wounds were superficial and required no surgical interference.

On the 28th he complained of abdominal discomfort and at 21.00 hours he developed fever. On the 29th, at 04.00 hours, he became unconscious.

When examined then the condition was: Pulse 174. Temperature 97.8° F. Respiration 14. B.P. 80/60.

Nervous system: Unconscious, not responding to painful stimuli. Pupils dilated and sluggishly reacting to light.

Reflexes: Knee and ankle jerks active on both sides. Plantars, indefinite response.

Lumbar puncture: Clear fluid under slight tension. No organisms found. Number of cells normal.

Urine: Catheter specimen, nothing pathological.

Stomach wash: Nothing abnormal.

Blood slides: Thick and thin film—M.T. + +.

On the above findings the diagnosis of pernicious malaria (coma) was made.

*Treatment.*—(1) Intravenous quinine bihydrochloride gr. 4, repeated every four hours. Total given, gr. 12.

(2) Intravenous nikethamide 3 c.cm. at once and repeated every thirty minutes. Total given, 45 c.cm.

(3) Tracheal tube passed under direct vision and plugs of mucus sucked out by a catheter passed through the tube.

The patient recovered consciousness at 13.30 hours on the 29th. No bad after-effects were noticed.

*Case 2.*—On the night of February 3, 1945, a young male Hindu was admitted at 00.15 hours in an unconscious state. He had had irregular fever for a few days and on the 2nd became unconscious at 20.30 hours. He was seen by a Medical Officer at 22.30 hours, diagnosed cerebral malaria (coma) clinically and given gr. 4 of quinine bihydrochloride, intravenously.

*Condition on admission.*—Pulse 120. Temperature 98.8° F. B.P. 80/62.

Nervous system: Unconscious but responded to painful stimuli. Reflexes—all tendon reflexes active. Plantars—indefinite response.

Lumbar puncture: Clear fluid under considerable tension (210 mm. of water). Drained until pressure down to 110 mm. of water.

Spleen: Palpable 1½ fingerbreadths below costal margin.

Blood slides: Thick and thin films negative. This may be explained by the previous injection of quinine bihydrochloride.

Urine : Catheter specimen—nil pathological.

From the history a diagnosis of cerebral malaria (coma) was made and it was decided to try the effect of nicotinic acid.

*Treatment.*—200 mg. of nicotinic acid in one pint of sterile physiological saline was given at a rapid rate. The effect was dramatic. The patient recovered consciousness in thirty-five minutes after the start of the nicotinic acid drip.

This was followed by one intramuscular injection of atebrin musonate gr.  $4\frac{1}{2}$  and the routine treatment for malaria.

#### DISCUSSION.

The pathology of pernicious malaria (coma) so far as is known is a blocking of the capillaries in the brain by embolisms of malaria parasites.

Because of its vasodilator action intravenous injections of nicotinic acid (5 to 10 mg.) have been given in cases of cerebral thrombosis by Furtade (1933), in angina pectoris by Nevahl (1934) and in Ménière's disease by Atkinson (1935), with promising results.

It was therefore decided to try the effect of the vasodilator properties of nicotinic acid and nikethamide in cases of cerebral malaria.

#### CONCLUSION.

Two cases of pernicious malaria (coma) are recorded and details of treatment are given.

Our grateful thanks are due to Captain G. C. Tandan, I.A.M.C., for his help in the examination of pathological specimens.

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## REPATRIATION OF WOUNDED IN WEST AFRICA.

By Lieutenant-Colonel W. G. LOVE,  
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[Received May 3, 1945.]

WHILST reading a paper from home recently I came across the following sentence : " The repatriated wounded were moved as soon as possible to hospitals near their homes." That sounds fairly simple and no doubt at home it is so but, in West Africa, the problem of transporting the sick and wounded of the 82 (WA) Division from the Burma front is rather more complicated. The following story is one which may illustrate the difficulties which have to be overcome. Fortunately, as at home, the co-operation between the military and civil medical services is excellent and is invaluable in cases such as this.

The repatriates are sent on arrival at Lagos to the Military General Hospital—there they are examined and treated and sorted into those cases which must remain for some time and those who can safely stand a long journey after a few days' rest. Whilst they are resting the A.D.M.S. contacts the D.M.S. (Civil) and, giving him the name of the man's town, asks if arrangements may be made to admit the man to the Civil Hospital nearest that town. This is speedily arranged and all is set for the commencement of the journey. In the case in point there were two repatriates, both stretcher cases, whose home town was Bamenda in the Cameroons, and arrangements were made for them to be sent to the Civil Hospital there. Bamenda is over 200 miles East of Enugu and has neither railway nor airfield near it. The journey is performed by road, track and river. From Lagos to Enugu there is a railway and the " Express " covers the 700 odd miles in three days and three nights. The gradients are considerable ; some bends are nearly hairpin ; halts at intermediate stations are apt to be prolonged affairs. The General Hospital at Enugu was notified when the cases were expected to arrive and an ambulance was there and took them to the hospital for a few days' rest before continuing their journey. Whilst the patients were resting, arrangements were being made for the next stage of the journey. The executive officer at Obubra on the Cross River was notified as to when he might expect patients to arrive and was asked to arrange for a canoe, the only means of transport available, to take them on the next stage. A reply was received that a steel canoe with sixteen paddlers and equipped with cooking facilities had been placed at our disposal and the patients were accordingly despatched from Enugu by ambulance on December 24. The party, besides the patients, consisted of two very intelligent W.A.A.M.C. orderlies, both Nursing Orderlies Class 1, the ambulance driver and eight W.A.A.M.C. stretcher bearers. These were sent because the road ends some miles from Obubra and the journey must be through the bush on foot. As it happened, these bearers need not have been sent because when they reached the road end they found that the District Officer had very thoughtfully provided a bearer party, consisting of a Prison Warder and sixteen convicts, who were to carry the stretchers to Obubra. The ambulance, with the W.A.A.M.C. bearers returned to Enugu and the patients, accompanied by the two Nursing Orderlies, proceeded slowly through the bush to Obubra where they found the canoe waiting for them and they set off in that at once.

The Cross River passes through some of the wildest parts of West Africa and numerous hippopotami and crocodiles are to be seen there. Fortunately they made little attempt to interfere with the canoe and the journey was quite uneventful until Ikom, the next stop, was reached two days later. Here the District Officer had arranged accommodation for two days, during which time the local dispensers looked after the comfort of the patients. Another canoe, which had been specially prepared with planks for the comfort of the patients, then set out for Mamfe on December 28. This canoe was slightly smaller and had nine

paddlers only. The journey to Mamfe occupied five days and was not quite such pleasant travelling as the river fauna showed an undue interest in the canoe. However, by shouting and splashing, they were frightened away and the journey was completed without mishap on January 3. The authorities at Mamfe had been notified by wire of the time of arrival of the party who were met by the District Officer. He made arrangements with the Medical Officer for the care and accommodation of the patients whilst they were at Mamfe and sent a telegram to Enugu notifying the hospital of the safe arrival of the party. It was not possible to obtain transport immediately and the party had to remain in Mamfe for five days before transport was finally arranged. The driver of the vehicle was instructed that under no circumstances was he to take anyone other than the two patients and two orderlies. This is a necessary precaution as the African driver tends to overload his vehicle. Bamenda was reached that same evening (January 12) and a party of convicts was again at hand in readiness to carry the patients to the local hospital. The Medical Officer had been notified by wire of the expected time of arrival and they were admitted without delay. They were questioned as to their treatment on the journey and said that they had been treated with exceptional kindness all the way and that the arrangements for their comfort and feeding had been very good. A wire was sent to Enugu notifying the safe arrival of the party at their journey's end. Their condition was good and they had stood the very trying journey well. Return transport was not available for the two orderlies for six days and they were housed and fed under the supervision of the Medical Officer during that time.

They started their return journey on January 18 and reached Mamfe that evening where they stayed for two nights before going to Ikom which they reached by canoe on January 22. There again they had to wait for three nights before a canoe was available to take them to Obubra. The District Officer at Obubra had wired to Enugu to arrange for transport to meet the orderlies at the road end and with their loads of kit and blankets on their heads they set off on their walk through the bush to the road end where they found transport awaiting them. They reached Enugu the same evening having had a round trip of thirty-five days, whilst the actual time spent by the patients on road, rail and river, exclusive of halts, was twelve days. To them the journey was nothing unusual—they had done the same thing before and it was merely a routine trip—the only thing that worried them was the fact that, on the journey from Ikom to Obubra, the canoe had nearly overturned and as a result one of them had lost his tunic in the river and was afraid he might have to pay for it. They had shown how capable the good African Nursing Orderly can be and, when complimented on the way they had carried out their task, showed surprise at such a routine job being commended.

Although this account is one of the journey only, it is a fair sample of the difficulties which have to be overcome on any of the numerous journeys of this nature which have to be taken. The secret of the success of such a trip as this lies in the fact that ample information is sent on ahead of the party and that the co-operation from the civilian authorities, both political and medical, is all that could be desired.

## PREVENTION OF SCRUB TYPHUS.

(JAPANESE RIVER FEVER.)

*From the Department of Hygiene, Royal Army Medical College.*

[Received May 7, 1945.]

(1) THE soldier fears Scrub Typhus more than malaria. Thus, forward troops are reluctant to enter suspicious areas and to "get down" on the ground. They readily adopt measures for prevention. The general incidence rate is not high,<sup>1</sup> though in one unit 50 per cent were infected; but the illness is long and severe, with a death rate of about 10 per cent, rising in some areas to 30 per cent or even higher.

(2) Man is infected by the bite of a mite, *Trombicula* (not an insect nor a tick though related to the spiders and ticks). Of the 120 known species of *Trombiculæ*, 3 are certain carriers and there are probably others. Certain species ("harvest bugs") cause "scrub itch"; not related to scrub typhus.

(3) ENTOMOLOGY.—Life cycle: Egg-LARVA-Nymph-Adult. The mite is entirely vegetarian in habit except that the larva, for its moult to the nymph stage, requires *one* tissue-fluid feed. If it fails to obtain this feed within three days it dies.

(4) The larva moves at the rate of one foot in five minutes. It seeks a patch of moist skin under cover, inserts its sucking tube and remains attached for four days. Only 1 to 2 per cent of larvæ become infected after feeding on an infected host. Infection passes through the egg to successive generations of mites.

(5) Having fed, the larvæ lodge in cracks and fissures in the ground, 4 to 6 inches below the surface. They are sensitive to desiccation and therefore tend to die off during dry weather. The adult dwells and lays its eggs in, or on, the ground.

(6) HOST.—The mite's natural host is a rodent; man is but an accidental host. Voles (field rats and mice) and bandicoots have been incriminated but the list of vertebrate hosts is not complete. As many as 200 larvæ have been found in each ear of a rodent which, however, does not itself die of the infection.

(7) SEASONAL INCIDENCE OF SCRUB TYPHUS.—Since the mite larvæ are sensitive to desiccation, in those countries (e.g. Burma)<sup>1</sup> where the climate provides wet and dry seasons the rise in incidence begins about six weeks after the onset of the rains, reaches its maximum within the next three or four weeks and remains high throughout the wet period and for a month or two beyond, when it falls sharply.

In the islands along the Equator, where it rains every day, there will be no close season.

(8) GEOGRAPHICAL DISTRIBUTION.—All lands in the Far East where operations against the Japanese have been or are likely to be carried on are potential sources of infection. The disease has not been recognized in continents other than Asia and the North of Australia.

(9) FOCAL DISTRIBUTION.—Capricious. In any district or locality one area may be highly infective while neighbouring areas, though in all respects similar, are free, even though the appropriate mite may be found there. Virgin jungle country is safe while cultivated land is the most liable to be dangerous. Land once cultivated but subsequently abandoned (secondary jungle) is dangerous in proportion to the age of the secondary jungle. Jungle ten years old is probably fairly safe. It is claimed that these types of country can be identified from the air.

Scrub typhus does not occur in towns; villages should be avoided.

<sup>1</sup> In Burma, during peak month, 1944, incidence was 1.66 per mille per mensem.

(10) RISK OF INFECTION IS GREATER, (a) in static camps, during the first four to six weeks' occupation of a previously unused site, (b) among front-line troops advancing into fresh territory.

No more danger lies in a previously occupied camp site than in any other piece of ground ; if infected, it must be avoided. See para (9), above.

(11) RELATIVE IMMUNITY is conferred by an attack of scrub typhus. The incubation period is from seven to twelve days. Early diagnosis is important for prevention.

(12) PREVENTION.—Scrub typhus is endemic, absolutely. Infection lies in a piece of land containing infected mite larvæ (analogous to gas-contaminated ground). It is not naturally communicated from man to man. (It may be just conceivable that the larva, disturbed during its tissue-fluid feed, might pass to another man, though the chances of its conveying infection are infinitesimally small). Therefore segregation and disinfection of cases and contacts do not come into the picture ; nor do human " carriers."

(a) CLOTHING.—The man's whole body must be covered, so far as practicable. Trousers tucked into socks ; gaiters or short puttees ; shirts buttoned at wrists and neck.

(b) IMPREGNATION OF CLOTHING with MITE REPELLENT. Impregnated clothing is *not* issued ; the man must do it himself. This is the most valuable protection yet devised. A definite drill has been evolved : Each unit turns out complete, with all clothing. Ground-sheets are spread, clothing is turned inside out. With 2 ounces M.R. in a cigarette tin, the man dips his fingers in the fluid, then smears each part of the garment 5 times until the whole surface has been covered—(sock, 6 smears ; trousers 30 ; shirt 25). One ounce of M.R. will give 100 smears. Special care is taken in treating—

- (a) the socks, which may be rolled in the hands,
- (b) the anklets or half-puttees, the trouser ends, flies and waist,
- (c) the shirt at neck, front opening and wrists.

One treatment should last two weeks, through eight washings. D.M.P. must be used, if necessary, at the expense of the antimalarial supply.

Exposed surfaces of the body are *not* treated (unless specially ordered).

(c) A vaccine is now in use. The first dose should be given before embarkation for the East, with subsequent six-monthly boosts. Considerable protection is anticipated from this vaccine.

(d) Men must sleep off the ground, either in hammocks or camp beds. The latter may be improvised from bamboo and other jungle vegetation. The ground-sheet alone does not protect.

(e) Choose the least dangerous camping ground available (*see* paras. (9) and (10) above).

(f) Clear the site of long grass, shrubs and other growth, using native labour. Later, adjacent jungle strips should be cleared.

(g) Bulldoze 6 inches off the ground surface, if possible.

(h) Burn over the area with flame-thrower, or by burning chopped grass.

(i) Spray camping ground with petroleum emulsion. Stock solution :—Dissolve 1½ pounds soap in one gallon hot water, add to 4 gallons kerosene, stirring all the time. Use 5 per cent of this solution in water, paying particular attention to cracks or fissures. The diluted solution is not inflammable.

(j) Propaganda.—Lectures, posters, film-strips, pamphlets.

(k) Kill off rodents. This is of doubtful benefit and very difficult.

[DDT should not be used as the value of this preparation as a mite destroyer is not proved. Indeed it is doubtful if it kills mites and it is known that it does not kill them sufficiently rapidly to prevent their biting their host.—ED.]

## *Clinical and Other Notes.*

### TWO RARE SEQUELÆ OF "ORGANIZED EXERCISE" IN THE ARMY.

By Major R. SALISBURY WOODS,

*Royal Army Medical Corps.*

[Received August 9, 1944.]

THE following two cases came under my care early in 1944 when in Madagascar. Although constantly and closely concerned with football injuries, and indeed with every kind of sports injury, among Cambridge undergraduates from 1919-1939, I have never seen any so unfortunate, since one patient lost his life and the other his limb. It may therefore be of interest to record what neither player could have foreseen, nor would have believed possible, when he went out to enjoy a regimental game of "Soccer."

#### *Case 1.—DEATH FROM ACUTE GENERALIZED PERITONITIS DUE TO RUPTURE OF ILEUM (TRAUMATIC).*

Lance Bombardier A., E.A.A.—Admitted to hospital on 7.2.44, for "Severe abdominal injury, N.Y.D., ? ruptured bladder."

*History.*—On 5.2.44 this Askari received a blow on abdomen (umbilicus) at football. Went off the field; kept quiet next day.

7.2.44. Seen by R.M.O. at 03.00 hours. T. and P. normal. R. 28. Pain, and tenderness on pressure (not so rigid later in morning). Later in day temperature subnormal. P. 120, R. 30. Rigid and tender. Extremities cold. Sent to C.C.S.

18.30 hours: Seen on admission. General condition very grave indeed. P. very poor, 130. Abdomen very distended and rigid. Pain and tenderness severe. Respiration embarrassed. Catheter produced normal urine.

*Diagnosis:* Perforated ileum with generalized peritonitis as sequel, and gaseous distension severe.

*Resuscitation.*—3 pints plasma, hot bottles, etc.

*Operation.*—Right paramedial approach (more plasma given). Vast quantity of faecal peritoneal fluid. About 3 to 4 pints mopped out (no sucker available) and perforation discovered in ileum down in right iliac fossa among coil of severely inflamed lymph-covered gut. About 8 feet of tape worm extruded in segments of 1 inch to 18 inches. This phenomenon occurred in most of the many abdominal stab wounds perforating the intestine which occurred in Diégo Suarez. General condition extremely grave. Perforation sutured. Large drainage tube; "D.I." List.

8.2.44: Died at 05.40 hours.

*Cause of death.*—Toxæmia from generalized peritonitis due to traumatic perforation of ileum.

#### *Case 2.—PENETRATING WOUND OF KNEE-JOINT, LEADING TO ACUTE SUPPURATIVE ARTHRITIS.*

Lieutenant W. S. D., E.A.A.

*History.*—25.9.43. An Askari player fell, open-mouthed, on to patient's left knee at football, driving one of his only two front teeth into patient's knee. Synovial fluid at once exuded from the punctate wound. Admitted the same day to Field Ambulance where "skin edges were excised and sutured, using M & B powder." Remained three weeks during which the swelling which had started before operation increased to a very large effusion. Pyrexia about 101° F. first week.

15.10.43: Discharged with some residual swelling but able to hobble about 200 yards. No improvement though he remained on duty from October 22 for five weeks.

24.11.43: Readmitted to Field Amb. with very swollen joint and severe pain. Heat, and "M & B 693" given and knee-joint aspirated in Fd. Amb. Operating Theatre. Nothing drawn off, so a small superficial incision was made over the old wound in the hope (he states) "that the stuff would run out by the path of least resistance."

14.12.43 : No improvement in swelling. Transferred to C.C.S.

*Condition on admission* : 14.12.43. Enormously swollen left knee-joint with fluctuation and much thickening of capsule. Pale skin. Movements very limited. Flexion 60°. Extension short by 30°. Looks pale and has lost 27 lb. weight during his illness (eleven weeks now). T. 99.4° F. at nights. Muscular wasting quadriceps marked. X-ray : No definite abnormality in films available (these were obsolete in 1941).

*Opinion*.—Despite initial trauma and possible sepsis this case looks more like a tuberculous arthritis. The limited movements, doughy, "soggy," fusiform white swelling, the chronicity, the loss of weight and mild pyrexia are all very suggestive after three months.

*Treatment*.—The left lower limb was accordingly encased in a P.O.P. cast from toes to groin to immobilize the knee and patient led a "sanatorium life" in bed on a second-floor verandah over the sea.

1.1.44 : Patient volunteered that swelling is obviously improving since "cast feels loose round the knee and pains at night have ceased." More comfortable and chart is flat (December 29 to January 4).

6.1.44 : T. rose sharply to 104.8° F., with pain and increase in polymorphs over two days. W.B.C. count = 11,800.

8.1.44 : *Operation*.—Undertaken immediately that night. Trocar and cannula, followed by stab puncture and lavage of knee-joint. Stinking pus evacuated, and limb put up on a Braun-Bohler splint with (adhesive) weight-extension. Vast amount of pus continued to discharge.

15.1.44 : Incision and drainage to drain "pocketing" in lower 1/3, outer aspect of thigh. Recommended for Hospital Ship evacuation to Kenya. Unlikely to serve again in Categories A, B, or C.

22.1.44 : Has made good progress in fourteen days from evacuation of knee-joint and a week since drainage of "pocket." Knee-joint itself has settled down, but there is a profuse purulent discharge from (last) upper incision in thigh.

25.1.44 : Pyrexia for two nights and "pocketing" on inner side of suprapatellar pouch. Thick offensive pus gently expressed (painful).

2.2.44 : Discharge *in statu quo*, requiring four-hourly dressings still. In addition there is now developed a new tender pink area over head of fibula.

5.2.44 : This is now fluctuating. Patient looks ill and is not making progress.

6.2.44.—*Operation*.—(1) Excision of all upper three sinuses and cavities in a row and wide "guttering" of whole area and removal of all necrotic granulation tissue leaving healthy sides to the wound.

(2) Free incision, evacuation and counter drainage (posterior) of wide cavity centering on head of fibula.

(3) Sulphanilamide powder used freely ; both wounds loosely packed with vaseline gauze and left wide open.

(4) P.O.P. cast applied from toes to groin. (Knee-joint itself apparently quiescent and not touched.)

8.2.44 : Looks very ill. Temperature rather less.

11.2.44 : Going down-hill in spite of the radical procedures of February 6 and knee-joint itself has now flared up from quiescence. *Operation* : Incision into either side of suprapatellar pouch and knee-joint left open to drain. Moderate amount of pus evacuated.

12.2.44 : Shows signs of slight improvement.

15.2.44 : Seen by Consultant Surgeon, East Africa Command, who approved treatment.

18.2.44 : New whole-limb cast applied and split for journey.

19.2.44 : Hospital Ship evacuation to Kenya, lying in whole-limb P.O.P. (split) cast.

*Comment* : A singular accident and a very sad finish to the career of a young pre-war regular soldier.

POSTSCRIPT.—17.4.44 : Letter from Brigadier R. Ogier Ward, Consultant Surgeon, E.A.C., mentioned that further pocketing occurred and, despite more transfusions (for infection), amputation had to be carried out after all. After this he "picked up fast and is now off home."

This paper is forwarded with the approval of the D.M.S., East Africa Command, to whom I record my thanks.



# PREPARATION OF A SOLUTION OF SODIUM HYPOCHLORITE BY THE ELECTROLYSIS OF SODIUM CHLORIDE

(AN IMPROVISED METHOD.)

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AND

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[Received April 3, 1945.]

(1) Sodium hypochlorite solution so commonly used in medicine can be readily obtained by the electrolysis of sodium chloride and a simple arrangement recently devised and used by the writers is described below :—

25 ounces of a 15 per cent solution of sodium chloride is subjected to electrolysis in the following manner :—

(i) The solution is run into an ordinary deep glass bottle with a narrow neck filled up to the neck.

(ii) Two electrodes are improvised from carbon rods,  $\frac{1}{2}$  inch in diameter and 4 inches long, recovered from unserviceable dry batteries used in the Army telephone receivers.

(iii) Rubber-covered electric wires obtained by stripping the cotton covering from "flex" wire are fitted to the terminals on the ends of the carbon rods and the terminals are covered with pitch heated to plastic state and moulded round the terminals and bare portion of the wires making a watertight covering of the terminals.

(iv) The carbon rods are next lowered to the bottom of the bottle, the space between the two rods being 2 to 3 inches, requiring an initial current of 2 amperes at 6 volts.

(v) Next the bottle containing the salt solution with the electrodes in position is placed in a vessel containing cold water at a temperature of 46° to 48° F. (room temperature was 60° F.).

In summer, particularly in hot countries, the temperature of the salt solution should be kept low by circulating iced water round the container.

(vi) The wires are next connected to a 6-volt battery with an ammeter in circuit.

(vii) As electrolysis starts, a solution of hypochlorite of soda is obtained due to the action of the nascent chlorine on the sodium hydroxide formed.

It will be seen that as electrolysis proceeds, the current increases from 2 to 4 amperes, heat is generated and a portion of the chlorine liberated escapes as gas from the surface of the solution.

To minimize this loss of chlorine it is essential that the temperature of the bottle is kept low by immersing it in cold water, that a small surface area is presented to the solution by using a narrow mouth container and that there is a good head of the solution above the electrodes so that the nascent chlorine may have time to act upon the sodium hydroxide formed yielding sodium hypochlorite.

(viii) Four to six hours electrolysis would yield a solution of sodium hypochlorite with a chlorine content of 0.42 to 0.49 per cent. Usually the solution is not sufficiently active below 0.4 per cent and above 0.5 per cent it becomes irritating.

(2) In our experiment samples of hypochlorite solution were collected at two-hourly intervals and the strength of available chlorine in each sample was determined by titrating it with freshly prepared N/10 sodium thiosulphate solution in the usual way. The following table shows the actual result obtained :—

Period of electrolysis	Chlorine content obtained
(a) 4 hours	0.42 per cent
(b) 6 hours	0.49 per cent
(c) 8 hours	0.53 per cent
(d) 10 hours	0.56 per cent

(3) The 0.53 per cent solution was subsequently tested in a Field Laboratory and the lowest dilution which showed no growth of *B. typhosus* was 0.25 per cent solution.

(4) It should be remembered that sodium hypochlorite solution is very unstable, quickly losing its available chlorine. Further, hypochlorites are decomposed by light; hence the solutions must be protected from light by keeping them in amber-coloured and, preferably, rubber-stoppered bottles.

(5) *Advantage of this improvised method.*—In times of necessity, if a supply of the sodium hypochlorite solution is not readily obtained from the normal sources of supply, medical or other units requiring this solution urgently can manage to procure a temporary supply with improvised equipment.

### SEROLOGICAL REACTIONS IN A CASE OF SYPHILIS TREATED WITH PENICILLIN.

By Major A. CAMERON EWING, M.B.,

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AND

Major C. RICKWORD LANE, D.M.

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[Received February 5, 1945.]

THE penicillin treatment of syphilis is in its infancy and details of the serological changes during the course of treatment are still being investigated.

The case here recorded shows a rounded-off picture, a report of which would seem to be important.

The patient was first seen on October 4, 1944, eighteen to twenty-seven days after the infecting exposure. He then had a penile chancre which, he stated, had been present for ten days and inguinal adenitis. Dark ground examination of the serum from the chancre revealed typical *Treponema pallidum*.

Treatment consisted of 40,000 Oxford units of sodium penicillin every three hours until a total dosage of 2,560,000 units had been given over a period of eight days. The sore became free from *Treponemata* eighteen hours after the commencement of treatment, the only other treatment having been saline dressings to the sore. No *Treponemata* were found on any subsequent occasion and the sore was completely healed eighteen days after the commencement of treatment. The swelling of the inguinal glands had almost completely subsided by this time.

Only Kahn tests were available at the time except for the tests on three specimens of serum on which the authorities of a Belgian University kindly consented to perform Wassermann and Kahn reactions. The results are recorded in tabular form.

Date	Kahn result	Wassermann result
4.10.44	Negative	
5.10.44	Doubtful	
8.10.44	Positive	
12.10.44	Strong positive	
*13.10.44	Positive	Negative
15.10.44	Weak positive	
*19.10.44	Positive	Negative
*22.10.44	Negative	Negative
22.10.44	Negative	

\* These results were from the Belgian University,

## DISCUSSION.

The Kahn test is not usually regarded as of itself sufficient evidence of an infection with syphilis, but in view of the clinical findings the specificity can hardly be in question here. The positive Kahn in the presence of a negative Wassermann is a well recognized finding in early syphilis, the former reaction being more sensitive.

The orderly sequence from negative through "strong positive" back to "negative" parallels the clearance of the primary focus of infection and while this cannot be taken as indicating the clearance of remote scattered penetrations of the *Spironemata*, the rapidity with which the reversal was effected leads to the hope of complete eradication.

[Footnote.—The reactions of the blood are similar to those which occur when arsenicals are used and are presumably of the same nature as a Hexheimer reaction. It was not the result of the Kahn tests which confirmed the diagnosis but the demonstration of *T. pallidum*. The positive Kahn tests were, presumably, the result of the flooding of the circulation with antigens from the *Treponemata* killed by the penicillin, this causing the tissues to produce anti-body.—ED.]

### ANEURYSM (SYPHILITIC) OF THE COMMON CAROTID BIFURCATION TREATED BY DOUBLE PROXIMAL AND DISTAL LIGATURE.

By Lieutenant-Colonel F. M. COLLINS, M.A., M.Chir.Camb., F.R.C.S.,  
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*Officer-in-Charge of Surgical Division of an Indian Base General Hospital.*

[Received November 6, 1944.]

FEW surgeons have occasion to treat sufficient cervical aneurysms to acquire dogmatic views on the best treatment; the occasional case seen by any individual surgeon each has special features, so that it seems worth while reporting any that occur.

Sapper J. S., of a Railway Company, Indian Engineers, a Telugu Hindu, aged 30, was first admitted to a forward Medical Unit on December 16, 1943, for a pulsating tumour of the left side of the neck of three months' duration. He was evacuated to an I.B.G.H. (I.T.), and admitted to the Venereal Wards on December 23. I was asked to see him on January 3, 1944. There was a mass on the left side of the neck, 2 by 1½ by 1½ inches, with its centre at the hyoid level, deep to but not attached to the sterno-mastoid, with a little horizontal but no vertical mobility; it gave an obvious expansile pulsation synchronous with the heart beat, but no thrill. Pressure of the common carotid artery against Chassaignac's tubercle stopped the pulsation to a large extent, but not completely. There were no symptoms of pressure on veins or nerves; the function of all was intact.

The diagnosis of carotid aneurysm was obvious.

The patient, intelligent and co-operative, gave a frank history of recent syphilis and gonorrhœa; Wassermann and Kahn were positive. He stated that he had first noticed the swelling towards the end of September; it had grown steadily, causing some discomfort and stiffness in the neck with difficulty in turning to the right, but no pain or tinnitus; swallowing had at times been a little difficult. The cardiovascular, respiratory and genito-urinary systems were normal.

Four weeks were given to antisyphilitic treatment, which produced no change in the local swelling.

Operation was carried out under intratracheal gas, ether and oxygen anæsthesia on February 5. A 4 inch incision was made along the anterior border of the sterno-mastoid; a transverse incision would have been more in keeping with the principles of cervical surgery and would have given as good exposure. Division of the deep cervical fascia, clearing and backward retraction of the sterno-mastoid, exposed the pulsating tumour. No attempt was made to dissect out the sac; it lay approximately at the carotid bifurcation, which is described as the site of election of cervical aneurysms. Some tributaries of the internal jugular vein (doubtless the superior thyroid and facial veins) were divided between ligatures. The main

internal jugular was stretched as a flat ribbon over the surface of the tumour, but it was patent with blood flowing along it. The common carotid artery was exposed above the omohyoid and a ligature passed loosely around it; tension on this ligature at once stopped all pulsation. The common carotid artery was then exposed with difficulty above the tumour, below the posterior belly of the digastric, and a ligature passed loosely; tension on this produced no effect on pulsation. The common carotid was then tied with No. 2 chromic catgut in two places  $\frac{1}{2}$  inch apart and a narrow segment of the vessel resected. The external carotid was next tied in two places with No. 2 chromic catgut but, there being no room to resect a segment, it was divided. It was not possible with the surrounding induration to be sure of the exact level of section but it was probably above the superior thyroid, lingual and facial branches. Following the double ligature all pulsation was arrested for good. The deep fascia was united with interrupted catgut and the skin with an intradermic nylon suture.

The wound healed by first intention though a small hæmatoma, which developed at the centre of the scar, was quickly absorbed and did not need aspiration.

Twenty-four hours after operation the patient said that his right arm was weak and he found difficulty in lifting his feeding cup off his bedside locker; this transitory weakness cleared up entirely in five days.

Ten days after operation he complained of some dimness of vision of the right eye. Examination by an Ophthalmologist revealed nothing abnormal and a week later he said full sight was restored.

On March 30 he complained for the first time of weakness of the voice; laryngoscopy revealed "left vocal cord lies in the cadaveric position and does not move on phonation. Right cord is moving well and compensating; left recurrent laryngeal palsy." This was not present before or immediately after operation. There was no thoracic aneurysm or other mediastinal lesion, and neither the recurrent laryngeal nor external laryngeal nerves were anywhere near the operation field. Possibly there is a syphilitic peripheral neuritis, as the slightly weak hoarse voice has persisted to date.

There has never at any time been any sign of recurring pulsation; the indurated mass of the aneurysmal sac has slowly absorbed, and to-day, May 12, there is a small lump about  $\frac{3}{4}$  by  $\frac{1}{2}$  by  $\frac{1}{2}$  inch, which feels like a slightly enlarged lymphatic gland.

#### CONCLUSIONS.

(1) A case is described of a small, early, idiopathic (i.e. syphilitic) aneurysm, practically symptomless and producing no pressure effects.

(2) Treatment was by combined proximal, as near the sac as possible, and distal, with some large intervening branches, ligature. Excision of the sac was not attempted, as this would have entailed a difficult and dangerous, and perhaps not a possible, dissection.

(3) Double ligature with division of the artery and, where possible, resection was preferred to simple ligature in continuity.

(4) The main vein was not tied; only small branches which might have interfered with the dissection.

(5) No effort was made to define the limits of the sac, which was almost certainly at the carotid bifurcation.

(6) Only slight transient after-effects, quickly recovered from, followed the cutting off of the blood supply of the left side of the brain; the laryngeal palsy had another, if obscure, explanation.

(7) Treatment was successful; no recurrence after three months.

Under Service conditions I have no opportunity to refer to the literature.

I am grateful to my Commanding Officer, Colonel R. K. Misra, I.M.S., for permission to forward this case, which occurred in his hospital.

## SIGNIFICANCE OF SUBCONJUNCTIVAL PETECHIÆ IN CEREBROSPINAL MENINGITIS.

By Captain J. D. DURANCE, M.B., B.S.Lond.,  
*Royal Army Medical Corps.*

[Received February 5, 1945.]

THE following observations were made in a series of 173 cases occurring in an outbreak of cerebrospinal meningitis at an East African recruiting depot.

According to signs, cases may be divided into three classes, viz. :—

(1) Subconjunctival petechiæ present, little or no neck rigidity, Kernig's sign negative (septicæmic stage).

(2) Subconjunctival petechiæ present, marked neck rigidity, Kernig's sign positive.

(3) No subconjunctival petechiæ, neck rigidity present, Kernig's sign positive.

The character of the cerebrospinal fluid in early lumbar puncture varies in these three classes as follows :—

(1) Little or no increase of pressure, C.S.F. clear, microscopical examination usually negative.

(2) Increase of pressure, C.S.F. clear to faintly milky and, on centrifuging, lymphocytes and extra-cellular meningococci present.

(3) Increase of pressure, C.S.F. turbid to purulent, pus cells present with extra-cellular meningococci, or, in the more purulent, many pus cells, but few or no meningococci.

There are, of course, all gradations between these three classes, and class (1) eventually passes into class (2) unless death supervenes previously.

The existence of conjunctival petechiæ as a diagnostic sign does not appear ever to have been stressed. The spots of "spotted fever" are not a common phenomenon in the European, and in the African are almost impossible to demonstrate except on the mucous surfaces. When they occur, subconjunctival petechiæ are found chiefly on the lower palpebral surface, and vary in number from one or two to a generalized mottling in this area, involving also the visceral conjunctiva. They appear early in the first day of the disease, whereas the spots on the skin, petechial or otherwise, are stated (Price, 1941 edition) to appear during the first week. During this series of cases petechiæ occurred in 45 per cent of all cases, rising to 60 per cent at the height of the epidemic. They were present in all fatal cases.

The existence of this sign indicates a virulent infection, and may be, in class (1), the only sign in the fulminating type. All instances of pyrexia or mental disturbance admitted to sick quarters here are examined as a routine for such petechiæ and it has thus been found possible to start treatment much earlier than would otherwise have been the case. Treatment consists, at this depot, of sulphapyridine, 2 grammes, made up into an emulsion, and administered intramuscularly, repeated after four hours; and by 1 gramme, by mouth, every four hours subsequently. Dagenan soluble has not been used, as it was not thought advisable where the ward staff consists of African dressers only, and medical officers' duties often prevent supervision of the technique. In the absence of neck rigidity lumbar puncture is now postponed until the next day. Such cases, when punctured later, have invariably been found to have a C.S.F. of variable turbidity with pus cells present.

It is emphasized that all patients exhibiting two or more subconjunctival petechiæ were treated as positive cases. In no other disease admitted to this hospital were these petechiæ found to be present, only in C.S.M. Subconjunctival hæmorrhagic effusion, however, as distinct from petechiæ, was not regarded as a diagnostic sign in the absence of classical meningeal signs.

*Death-rate.*—In the first 144 cases, which were spread over a period of three months, there were 15 deaths; 29 fulminating cases were then admitted over a period of five days, and 10 of these died, thus bringing up the mortality from 10½ per cent to nearly 14½ per cent over the whole period. It is reasonable to hope, however, that the death-rate will diminish when

the peak of the epidemic is past. Of the 25 deaths, 21 died on the day of admission, many before treatment had a chance to take effect or even to be given. Two died after two days, one after three, and one after four days hospitalization.

In considering the death-rate it is necessary to realize that we are dealing with a shifting population, some from districts where the disease is common, and others who have never had an opportunity to form their immunities. The average period from recruitment to admission with C.S.M. was twenty-four days. Taking these facts into consideration, and the apparent virulence of the infection, it is fair to assume that without recognition of this sign the death-rate would have been much higher.

*To Summarize.*—Although it is realized that there are other causes of subconjunctival petechiæ, it is safe to treat all cases of pyrexia or mental disturbance which exhibit this sign in the first day of the disease during an outbreak of cerebrospinal meningitis as positive and to commence chemotherapy immediately. In the absence of neck rigidity, early lumbar puncture is of no value either diagnostically or therapeutically.

The absence of subconjunctival petechiæ in a proven case of C.S.M. is a good prognostic sign.

Thanks are due to the D.M.S., E.A.C., for permission to forward this article.

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### Reviews.

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**MANUAL OF PSYCHOLOGICAL MEDICINE.** For practitioners and students. By A. F. Tredgold, M.D., F.R.C.P., F.R.S.E. London: Baillière, Tindall & Cox. 1943. Pp. xii + 298. Price 18s. net.

There are many sub-divisions within the special field of psychiatry but a clear trend towards a widening point of view amongst psychiatrists has been manifest for some considerable time. The stimulus of war is undoubtedly responsible for increasing this trend. The exigencies of war have called many psychiatrists from their special cloisters to work in wider spheres resulting in a closing of ranks in consequence of the need for promoting mental health. As typical of this trend Dr. Tredgold, an outstanding authority on mental deficiency, has now written a *Manual of Psychological Medicine*. He has endeavoured to produce "a reasonably short, plain and practical account of this branch of medicine" which he defines as "that branch of medicine which deals with diseases of the mind as apart from the body." Feeling the desire to fill a war-time need and recognizing as he does at the present time that "the average practitioner is extremely ill-instructed in this subject," his book is intended for students and practitioners for whom it will prove a storehouse of information.

In attempting to cover such a wide field in this way the author has necessarily had recourse to classification into clinical entities and, as is perhaps inevitable in such a condensed comprehensive work, the approach is mainly descriptive especially so in the field of neuroses. Some unorthodox views are expressed but these are not such as to mislead the serious student who will be stimulated to a more extensive reading than can be encompassed within such a *Manual*.

There is a valuable chapter on legal relationships, procedure, duties and responsibilities of the medical practitioner which will be of considerable value to the non-specialist.

The final chapter on sociological considerations indicates clearly that the author takes a broader view of his subject than his definition of *Psychological Medicine* would suggest.

It is to be hoped that in the next edition Dr. Tredgold will add a chapter on the psychopathic personality in order to give an outline of the Psychiatric Social Problem Group and also a chapter on psychosomatic disorders which form such a large proportion of the general practitioners daily lot.

HYGIENE—A MANUAL OF PUBLIC HEALTH. By J. R. Currie, M.A.Oxon., M.D., D.P.H., and A. G. Mearns, B.Sc., M.D., D.P.H. Edinburgh: E. & S. Livingstone, Ltd. 1945. Pp. xv + 432. Price 21s. net.

The conception of what constitutes "Public Health" and "Social Medicine" is causing much discussion at the moment and it is encouraging to read a book which maintains such a balanced outlook on the problem.

The book concentrates on the technical and scientific aspects of the subject and the clear descriptions should be of great value to medical practitioners and medical students as well as to those working for the D.P.H. The book should also be of value to non-medical readers interested in social conditions.

The authors do not avoid the controversial or political aspects of the subject but are to be congratulated on their impartial presentation of different points of view.

The book is well produced on good paper and includes interesting illustrations. A minor criticism is that the illustrations of infectious diseases seem to be somewhat highly coloured.

In their preface the authors stress the impetus to Hygiene given by the War. Progress continues and we hope a further edition of this book incorporating fresh advance will be published in the not too distant future.

H. A. R.

BONE-GRAFTING IN THE TREATMENT OF FRACTURES. By J. R. Armstrong, M.D., M.Ch., F.R.C.S. Foreword by R. Watson Jones. Edinburgh: E. & S. Livingstone, Ltd. 1945. Pp. xii + 175. Price 25s. net.

There has long been need for a book devoted to the subject of bone-grafting and one carrying the stamp of a writer who has learnt his teaching from practical experience. Such a book is that of Armstrong on the application of bone-grafting to the treatment of fractures. This is not one of those volumes whose excuse for writing is a single contribution to the subject, which is then inflated to booksize by the inclusion of all the traditional operations of the textbooks and the museums. The writer is quite definite in his ideas that he has found the tibial onlay the most satisfactory procedure as far as the long bones are concerned. A clear description of the operative technique for all the common long bones is given and one is impressed by the simplicity of the tools and methods used. A valuable feature is a clear description of the anatomical exposure of the shafts of the long bones which is all the more welcome as Henry's description is out of print and difficult to find.

It would be worth possessing this book for its description of the onlay graft alone; it is, however, made particularly valuable by containing first-hand descriptions of the three original contributions of the writer to this subject, namely, the closed technique for grafting the scaphoid and the indications for this operation; the "split-bone" technique for grafting the tibia; and the method of posterior sub-astragaloid fusion by the buried graft.

The book has been kept commendably brief with the result that there is no feeling of "padding" and interest is maintained from beginning to end. The whole field of grafting in its application to fractures is covered and one may be quite certain that, having decided that a graft is necessary, the best way to execute it for any particular bone will be found here.

It is customary to find faults, more to show that the reviewer is on the *qui vive* rather than that the author is necessarily at fault. Two points might be attended to at the next edition. The glib statement that removal of even such a small graft as a bone peg from the subcutaneous border of the tibia can result in spontaneous fracture of the leg needs a little more clinical verification if readers are not to be harassed in their sleep. It would be interesting to know how many times the writer has seen or heard of this accident and whether any explanation, such as the too liberal use of transverse saw-cuts to free the graft, could be found.

A second criticism concerns the writer's mental picture of the function of screws in securing an onlay graft, as this seems to differ from the reviewer's. The writer would appear to believe that the firmness of the graft depends on the screws cutting a thread in the graft

itself. Thus on page 12 he states "... as the screws have then three layers of hard bone on which to grip, i.e. the proximal and distal cortices of the host bone as well as the graft itself." Similarly on page 35 he recommends a  $\frac{7}{64}$  inch drill for the host bone (the correct tapping size for the usual screws); a  $\frac{1}{8}$  inch drill for the graft; and a  $\frac{9}{64}$  inch drill (the clearance size for these screws) to touch the hole in the graft "... to facilitate starting the self-tapping screws." If the screw cuts a thread in the graft, as well as in the host bone, it will be impossible to reduce any residual gap between the graft and its bed once the head of the screw has reached the surface of the graft. In this case it can only compress the graft against its bed by stripping the threads from the graft. Just as in a metal bone plate the holes in the graft must be the full clearance size throughout, i.e.  $\frac{9}{64}$  inch, and thus the  $\frac{1}{8}$  inch drill is unnecessary for this purpose.

Every orthopaedic surgeon should possess a copy of this authoritative work.

J. C.

**THE STUDENT'S POCKET PRESCRIBER.** Twelfth Edition. By David Mitchell Macdonald, M.D., D.P.H., F.R.C.P.E. Edinburgh: E. & S. Livingstone, Ltd. 1945. Pp. xvi + 348. Price 4s. net.

The twelfth edition of this handy pocket book is intended, as in previous editions, to guide the student prescriber in matters pharmacopœial.

A large proportion of the book is devoted to specimen prescriptions classified according to diseases, no doubt of value to the young civilian practitioner in normal times, but some of the ingredients recommended are at present in short supply or unobtainable. Some selected N.H.I. and N.W.F. formulæ are included and, being extracted from the 1943 edition, are, in consequence, more practicable.

Short lists of modern remedies and proprietary preparations form a useful reference, as also do selected and abbreviated monographs of new medicaments as published in B.P. 1932 Addenda and B.P.C. 1934 Supplements.

Some brief notes on such subjects as Diet in Disease, Vitamins, Dangerous Drugs, etc., with Posological and other tables, complete a pocket book that, whilst it may be of value to the young student or practitioner, can be of limited value only to Army personnel.

R. G. F. B.

**AVIATION MEDICINE.** By L. H. Bauer, M.D. Edited by H. A. Christian, A.M., M.D., LL.D., Sc.D., F.A.C.P., F.R.C.P.Can. Oxford University Press, New York Inc. (Humphrey Milford). 1943. Pp. 46. Price 8s. 6d. net. Reprint from Oxford Loose Leaf Medicine.

The book is primarily intended to present a picture of the scope of the duties of a Flight Surgeon—a title that is itself defined.

It sets out the methods of investigation required for the selection of a Pilot and lays proper stress on the psychological factors involved. It also discusses the means by which a Pilot can be kept fit for his job and "staleness" avoided, or at any rate diagnosed early and treated.

Some interesting figures are quoted showing the relationship between physical defect and flying ability and the physiological aspect of the subject is touched upon lightly. The book does not by any means answer all the questions that a general medical reader may ask, and the management of patients during flight is outside its scope. It does, however, serve as an informative introduction to an increasingly important subject.

J. S. R.

**MEDICINE FOR NURSES.** Fourth Edition. By W. Gordon-Sears, M.D.Lond., M.R.C.P. Lond. London: Edward Arnold & Co. 1945. Pp. viii + 460. Price 10s.

"Medicine for Nurses" is one of the best reference books for trained nurses. It is also excellent for Sister Tutors' use in the finishing years of a Student Nurse's training.



ILLUSTRATIONS OF BANDAGING AND FIRST-AID. Third Edition. Compiled by Lois Oakes, S.R.N., D.N. (Leeds and London). Edinburgh: E. & S. Livingstone, Ltd. 1944. Pp. vii + 272. Price 6s. net.

The instructions in this book are clear and concise, with excellent illustrations. We consider it should prove a useful book.

CELLONA TECHNIQUE. Sixth Edition. Hull: T. J. Smith & Nephew, Ltd. 1944. Pp. 105. 140 illustrations.

This handbook deals with the functional treatment of fractures, with sections on plaster treatment of tuberculous conditions, soft-tissue injuries, burns, etc.

The supply of the handbook is limited, but T. J. Smith & Nephew, Ltd., Neptune Street, Hull, will send a copy to any doctor who does not already possess one or whose edition is out of date.

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### Notices.

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PRESENTATION OF THE HONORARY FREEDOM OF THE COUNTY BOROUGH OF CROYDON TO MAJOR-GENERAL SIR ERNEST COWELL, *K.B.E., C.B., D.S.O., T.D., D.L., M.D., F.R.C.S., K.H.S.,* late R.A.M.C. (T.).

On Saturday, April 28, 1945, in the Council Chambers of the Borough of Croydon, the Mayor, Alderman and Council, together with a large and representative gathering of citizens of Croydon and others, were present at the Ceremony when Major-General Sir Ernest Cowell was presented with the Honorary Freedom of the Borough.

This was probably a unique occasion and many interesting speeches in which the work that General Cowell had carried out in civil defence, for the Red Cross, and in the provision of air ambulance services for the Borough were referred to, and also his war service in France and in North Africa.

The Minister of Health, the Rt. Hon. H. U. Willink, *M.C., K.C., M.P.*, who is one of the Members of Parliament for Croydon, drew attention to the fact that General Cowell belonged to the Territorial Army and that it spoke a great deal for his efficiency and the wide outlook of the R.A.M.C. that a Territorial officer had held such high and important posts during this war.

The whole Corps will wish to congratulate General Cowell on a signal and unique recognition of the high esteem in which he is held by his fellow townsmen.

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### OUR PRESIDENT.

By SERGEI YUDIN (Member of the Academy of Sciences of the U.S.S.R.)

The Academy of Medical Sciences has elected Nikolai Burdenko, Hero of Socialist Labour, its President. Burdenko is the chief surgeon of the Red Army in the field and for twenty years headed the surgical clinic of Moscow University.

Nikolai Burdenko had a cheerless childhood and adolescence in the Penza Ecclesiastical School and Seminary. He was forced at a tender age to do private tutoring to earn, not only his own livelihood, but sufficient for his parents. As a University student in Tomsk and Yuriev, he engaged in revolutionary activity, took part in underground publications and on several occasions was expelled from the University and exiled by the police.

As a fifth-year student he went to forward positions in the Russo-Japanese war which gave him first-hand experience in war surgery.

In 1910 he began his work as Professor in Yuriev University where Pirogov himself had started his academic career.

When the first world war began Burdenko went to the front as an experienced surgeon. He was director of surgical activity of the Red Cross and consulting surgeon to one of the

armies which widened his administrative and surgical knowledge. It was in those years that he became particularly interested in neuro-surgery.

After the overthrow of the Tsarist Government Nikolai Burdenko was appointed chief sanitary inspector of the Army in the field.

After the war Burdenko rejoined the Faculty of the Yuriev University which had been evacuated to Voronezh. In 1923 he was sent to the University of Moscow. Here the range of his creative and scientific research activity widened from year to year. An ever increasing number of medical institutions came under his direct leadership. His favourite science of neuro-surgery, at first represented by a separate cranio-brain department in the Clinic at Devichye Polye, found a second base at the Roentgen Institute. This activity expanded to such an extent, such great benefit was given to patients, so many neuro-surgeons were trained, that a new independent Central Institute of Neuro-surgery was set up. To-day this institute enjoys world-wide fame.

Enjoying full government support Burdenko was able to make excellent use not only of his own vast knowledge but, as a mature scientist, managed to enlist a whole galaxy of specialists in related fields, thereby ensuring a comprehensive study of the most complex scientific and practical problems of neuro-surgery.

Burdenko himself, though chairman of the Council of the People's Commissariat for Public Health of the U.S.S.R. and chief consultant of the sanitary administration of the Army, while engaging in wide public and political activity, has never given up his main vocation—surgery. Between lectures at the university or surgeons' "refresher" courses, between reports to the All-Russian Congress of Surgeons and attendance at sessions of the Supreme Soviet of the U.S.S.R., he has invariably found time to perform operations and to make clinical inspections of patients.

One of the secrets of Burdenko's success, apart from his talent and phenomenal capacity for work, is precisely the fact that, in spite of his various activities, he has managed to maintain the treatment of patients and to perform operations. He shows an equally lively interest in the problems of reducing pain in traumatic shock and in all spheres of surgery. His clinic at Devichye Polye and the scientific activity of his assistants and students vividly reflect this interest in a wide range of problems.

Of Nikolai Burdenko's original scientific work of recent years the most renowned are unquestionably his achievements in the sphere of neuro-surgery. As chief surgeon of the Red Army, directing all the resources of science towards saving the lives of wounded men and commanders, enabling most of them to return to the ranks, he has gained world fame.

Burdenko recently returned from his latest trip to the front. With a brigade of prominent specialists he studied there the action of the new preparations—penicillin and gramicidine, the latter produced by Professor Ermolyeva, Stalin Prize-winner. He studied and proved the beneficial prophylactic effect of the new preparations in preventing after-wound sepsis and gas phlegmon complication.

Soviet surgery is guided by a motive force generated by Nikolai Burdenko who is constantly searching and creating. It was these qualities which unanimously elected him to the head of the highest medical body in the U.S.S.R.—the Academy of Medical Sciences.

#### EMERGENCY HELP COMMITTEE.

JOINT COUNCIL: ORDER OF ST. JOHN OF JERUSALEM AND BRITISH RED CROSS SOCIETY.

THE following outline of the work of this organization is published so that officers may be able to advise their men as to the assistance offered.

Originally, the Scheme came into being in 1920 "in order to assist sick and disabled men who are in distress in consequence of the war" and up to the end of 1943 more than £1,600,000 had been spent to this end on 1914-1918 ex-Service men. In 1940 the plan was extended to include help for the men and women disabled and discharged from Service life in this war, provided their applications for help conform to the four general qualifications under which

the Scheme is administered : (a) The need must be connected with disablement ; (b) the applicant must have served either in the war of 1914-1918 or in the war of 1939-4— ; (c) there must be a definite end in view ; (d) the proposed assistance must not be primarily within the scope of some other Voluntary Fund or of a Public Authority. (The Public Authority concerned is usually the Ministry of Pensions; other Voluntary Funds recognize the Emergency Help Scheme as the proper one to deal with disability pensioners or men and women awaiting decision on pension claims which are deemed likely to succeed.)

If the applicant fulfils these four basic conditions the Emergency Help Scheme can operate on his or her behalf in a variety of ways. Financially, it can help during emergency periods with recoverable advances against possible award, or renewed or increased awards, by the Ministry of Pensions. The Scheme also provides maintenance allowances for men who suffer a temporary breakdown due to their disability with a resulting loss of earning power, and will pay furniture removals, travelling expenses and other items.

The Scheme lends a helping hand in all kinds of emergency situations—dental treatment, convalescence, clothing, invalid diet, surgical and sick-room appliances.

One particularly useful service to limbless men—for which there is a special fund—is the provision of motor units for invalid chairs which are supplied by the Ministry of Pensions. War-time restrictions have for the time being, unfortunately, limited the issue of these motors to men who either would suffer in health from hand-propelling the chairs or who need them for journeying to their work.

The Scheme also provides business equipment or stock for those within its scope who want to start a business of their own, but operates only in those cases where the disability prevents the applicant from taking advantage of any existing Government training or rehabilitation scheme.

The most important aspect of the Emergency Help Scheme is that it lives up to its name—that help in an emergency is always given to the deserving, however great or small that help may be. Sometimes a train fare from London to Cardiff will make just the difference to a man's existence, sometimes it is a question of supplying him with two warm blankets or of giving him the advice of experts on his post-war plans for a new business in a new town or of getting him fit to go back to his old job in his home town.

The Scheme specializes in help to the disability pensioner, or to the man and woman who is awaiting the decision of the Ministry of Pensions, and does not overlap with the other ex-Service funds.

This, briefly, is the work of the Emergency Help Scheme. There is an E.H.S. Representative in every county of England and Wales, and a main office in Northern Ireland and Eire. Application should be made to the appropriate County Representative, or to Headquarters, Emergency Help Committee, 12, Grosvenor Crescent, London, S.W.1.

### ROYAL VICTORIA HOSPITAL, BELFAST.

#### HOSPITAL SUPERINTENDENT.

THE Board of Management of the Royal Victoria Hospital, Belfast, requires the services of a Medical Superintendent or House Governor.

The Royal Victoria Hospital is a voluntary hospital and the principal teaching hospital of the Belfast Medical School which is one of the largest in the United Kingdom. There are 554 beds in the general wards, a private patients' hospital of 92 beds, and a maternity hospital of 96 beds, together with a large extern department and a small convalescent home. Large extensions of the Hospital are contemplated in the immediate future.

Previous experience of hospital administration is essential.

Salary will be £1,200 to £1,750, according to experience, with a free house.

Applicants, including those at present serving in H.M. Forces, should forward full particulars with copies of recent testimonials to the Honorary Secretary, Royal Victoria Hospital, Belfast.

## EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps and articles of a non-scientific character may be accepted for publication under a nom-de-plume.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twelve reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twelve excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W.1."

## MANAGER'S NOTICES.

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Cheques, etc., should be made payable to the "Journal R.A.M.C.," and crossed "Holt & Co."

Communications in regard to subscriptions, change of address, etc., should be addressed "THE MANAGER, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.2, War Office, Whitehall, S.W.1."

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the Journal should not be taken as an indication that they are necessarily available for export.

## ADVERTISEMENTS.

*Communications regarding Advertisements should be addressed—*

G. STREET & CO., LTD, 8, SERLE STREET, LONDON, W.C.2.

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## *Original Communications.*

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### THE HEALTH OF THE MIDDLE EAST FORCE, 1942—1943.

By Colonel A. E. RICHMOND, O.B.E., M.R.C.S., L.R.C.P., D.P.H., D.T.M. & H.  
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FOREWORD.—Major-General J. C. A. DOWSE, C.B.E., M.C., D.M.S., M.E.F.

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## J. SUMMARY.

## FOREWORD

By Major-General J. C. A. DOWSE, *C.B.E., M.C., D.M.S., G.H.Q., M.E.F.*

THE health records of the Forces in the Middle East, including those operating in the desert campaigns and the subsequent fighting in Cyrenaica and Tripolitania, compare more than favourably with those of other theatres of war in the past. The high standards of health, and the physical and mental fitness achieved, were only made possible by the untiring efforts of those responsible for the organization for the maintenance of the health of the troops and the prevention of disease, and by the whole-hearted co-operation of everyone from Commanders down to the Private soldier himself.

This article demonstrates the difficulties that were met with in the Middle East from the hygiene aspect and gives information showing how the many problems were handled. It illustrates also a wider concept of the present-day responsibilities of military medical authorities than is probably appreciated by many, even by members of the medical profession. This concern in the application of modern preventive medicine and hygiene has made a heavy demand on the technical resources of the Medical Services, especially under the complex conditions of the Middle East, during the difficult times of 1942.

Study of this account should therefore afford food for thought for all medical men interested in this aspect of military medical work. It will also be read with profit by many laymen to whom public health matters, whether of a type peculiar to the fighting services or of a more general kind, are of interest.

The authors are to be congratulated on so ably presenting this excellent picture of the Hygiene "War" in the Western Desert during 1942 and 1943.

## A. THE CONSTITUTION, ENVIRONMENT AND ACTIVITIES OF THE MIDDLE EAST FORCE.

It is doubtful if military history has previously shown, or will ever exhibit again, the complex that characterized the Middle East Force during 1942 and 1943. Its soldiers came from three-quarters of the globe. There were men from the temperate climates of the United Kingdom, France, Belgium, Poland, Yugoslavia, Greece, Australia, New Zealand and South Africa. There were Africans from every part of the Continent—east, west, and the High Commission Territories of the south. There were Indians of all types, and men from such Indian Ocean islands as Mauritius, Ceylon and Seychelles. There were finally the groups recruited locally—Palestinians, Maltese, Cypriots, Syrians, Arabs, Iraqians and Sudanese. The soldiers of all these races were compounded into a mighty army which, as Mr. Churchill said in a broadcast in 1942, numbered nearly a million men. These million men were distributed amongst the Eighth Army in the Western Desert of Egypt and Libya, the Ninth Army in the Lebanon and Syria, and the garrisons and base installations of Cyprus, Malta, Palestine, Egypt, Aden, Sudan and Eritrea. Their campaigns were conducted amongst equally heterogeneous civilian communities, where colour, religion, customs and state of urban and rural development were infinitely varied. Arabs, Syrians, Lebanese, Jews, Copts, Moslems, Negroes, Ethiopians, Christians, Europeans, were all represented. From these civilian communities came over a quarter of a million men to move the stores and to build the warehouses, workshops, roads, railways, docks, barracks, hospitals and fortresses demanded by the Middle East Force.

The physical and climatic environment containing these armies and communities showed

extremes too. In the west, south, and east were the immense sandy and gravel deserts of the Sahara, the Sinai and Arabia. Here days and nights were hot and dry in summer, but in winter tolerable days too frequently were succeeded by bitterly cold nights. In the mountains of the Lebanon and Palestine, snow and sleet created arctic conditions in winter. The Delta of Egypt, the Nile Valley and the coastal plains of Palestine and Syria are green with vegetation and foliage. However, except for some patches in Palestine, Syria and Cyprus, forests are wanting in the Middle East scene. This geographical setting was immense. It covered half the Mediterranean, the eastern half including the islands of Malta and Cyprus. In it there were half a dozen States with their own national systems—Syria, Palestine, Egypt, Sudan, Eritrea and Libya. It possessed thousands of miles of waterways in the Nile and its Delta, along which moved hundreds of barges and tugs carrying warlike stores. The common railway system, extending a thousand miles from Tobruk in the west, through Egypt, Palestine and Syria to link with the Turkish railways and so with Europe, owed its completion to Army engineers from South Africa, Australia and New Zealand. A vast telephone system produced a clear voice in Cairo from Baghdad as easily as it did from Benghazi. It possessed in Cairo, Alexandria, Beirut, Tel Aviv, Haifa, Jerusalem and Damascus, mighty Oriental cities from which came manufactured products and other supplies, and to which soldiers streamed in thousands on leave.

The constitution of the Middle East Force and its environment provide some of the background of the story of its health. A further important factor lay in its activities during 1942 and 1943. The spectacular role was played by the Eighth Army in the Western Desert. This was in three stages—the static first stage when the Eighth Army faced the enemy at Gazala, the second in the unhappy retreat in May and June, 1942, back through Tobruk, Mersa Matruh to El Alamein, and then the final stage in the victorious advance from here to Tunisia, reached in March, 1943, and culminating in the combined operation against Sicily. In the Sicilian Campaign the Eighth Army remained a Middle East responsibility for administrative purposes until August, 1943, after which it passed under the control of Allied Forces Headquarters in North Africa. Thereafter, only the unhappy incident of the Dodecanese Islands, when Leros, Cos and Lemnos changed hands twice, was to be classified as an operation. The shift of the war to Italy changed the nature of the Middle East Force so that, at the end of 1943, its importance lay not in actual fighting but in guarding the vital communications through the Suez Canal, acting as an insurance for peace in the important group of countries in the Eastern Mediterranean, and in developing its workshops and warehouses to suit the needs of armies elsewhere.

This aspect of the importance of the Middle East Force has been naturally overshadowed by the desert campaigns, but should not be minimized. The Force went a long way to becoming self-supporting. It obtained much of its food locally, it achieved miracles of manufacture and improvisation in meeting the immense demand for every conceivable article used by an army—mines, clothing, machinery, vehicles, weapons, hardware, medical apparatus. Its repair shops kept vast numbers of both ordinary and armed vehicles going, and guns and apparatus of all kinds ready for use. As well, therefore, as the special problems of war, the Middle East Force had also to concern itself with many health and medical aspects of an industrial community.

#### B. THE HEALTH AND MEDICAL ORGANIZATION.

The medical organization had its origins in the peace-time British garrisons of Egypt and Palestine from which the first members of the medical branch of G.H.Q., M.E.F., were recruited. This branch eventually expanded to form in 1942 and 1943 a large administrative office under the Director of Medical Services, a Major-General. It was modelled on the usual British Army lines with sub-directorates for planning and organization, personnel, hygiene, nursing, dental, pathological and laboratory services. A group of consultants and advisers covering most of the specialities of medicine and surgery was attached to the branch. It had available, too, laboratories equipped to tackle pathological, bacteriological, entomological, food and



chemical problems. The important principle to be noted in this arrangement, typical of the British Army anywhere, is that the D.M.S. has two distinct functions at headquarters. In the official words :—" He is the adviser of the Commander-in-Chief on all medical and other matters affecting the health of the troops, and is responsible to him for the medical and health services of the force."

The responsibility of the D.M.S. for the medical and health services of the Army is an executive function. It is this, with its handling of sick and casualties and its use of such medical units as field ambulances and hospitals, which is best known both to the Army and the general public. Yet absorption in its urgency and importance to the detriment of less spectacular preventive medicine and public health needs of the Army would mean an incomplete observance and interpretation by the Medical Services of their duty to the Army. This is a distinct danger, various aspects of which it is proposed to discuss on some future occasion.

Following the usual system of decentralization, the Middle East command had a number of local area and sub-area commands, apart from its operational forces of the Eighth and Ninth Armies, etc. These subsidiary headquarters possessed senior medical officers administering the local medical functions. In each headquarters, a hygiene officer acted as a technical adviser in his field. Some of these local commands were immense, with correspondingly large and varied medical responsibilities. The most prominent operational command—Eighth Army—was completely self-contained in having a headquarters medical branch, and medical staffs at the headquarters of the corps and divisions. Field ambulances, field hygiene sections, casualty clearing stations, and such special units as hygiene, malaria and pathological laboratories, dental, blood transfusion, surgical and other special units were lavishly provided.

In the static or area commands, the most complex and largest was that responsible for Egypt. In its executive function of providing medical services it held large numbers of both general and special hospitals containing thousands of beds. Not only were these for local troops but were also the main hospital provision for the Eighth Army and such other areas as Cyrenaica and Tripolitania. Other medical functions were involved in the case of convalescents in various depots, in the examination and regrading of thousands of men returned to depots or discharged from hospital, in the ordinary everyday medical treatment and examination of men in units and depots. The health organization in this command consisted of a hygiene specialist at Command Headquarters, and at each area and sub-area, a total of eight in all. Field hygiene sections under the area hygiene officers maintained a supervisory and advisory role over the troops, camps, barracks, factories, workshops, depots, in their areas. The hygiene officers and field hygiene sections whose area contained large urban communities, such as Cairo, Alexandria, Port Said, etc., had, in addition, large responsibilities in supervising premises used by the troops on leave or for recreation—hostels, hotels, leave camps, cafes, etc.

On a smaller scale, local medical and health staffs supervised the medical treatment and health and sanitary needs of Palestine, Syria, the Lebanon, Cyprus, Malta, Cyrenaica, Tripolitania, the Sudan, Eritrea and Aden.

All routine provision of medical supervision, care and treatment, and of the machinery to maintain the troops' health, protected from infectious disease and suitably clothed, fed and housed, was thus met by this system of decentralized medical authorities. All major problems of direction, policy and co-ordination were left for handling by the Medical Branch of General Headquarters.

These various medical staffs supervising, advising and directing, from General Headquarters down through Army, Corps and Divisional Headquarters on the one hand, and Command, Area and Sub-Area Headquarters on the other, ultimately depended for the successful execution of their duties on the various medical units and on the regimental medical officers. It is through the regimental medical officer that the ultimate dual health and medical functions are mainly undertaken. In the Middle East, as elsewhere, the unit medical officer has watched over the health of the soldier, treated him when ill, sent him to hospital when his condition put him out of action, supervised his environment, his food, exercise, clothing, recreation and, in fact, all his activities in their health aspects. The unit medical officer has had the help in

major problems of hygiene personnel and of field malaria units. However, his success has depended always on the willingness, interest and enthusiasm of the commanding officer who has the ultimate responsibility for the health of his troops, whether he be Army, Divisional, Brigade or Battalion commander.

### C. HYGIENE TRAINING AND EDUCATION.

The heterogeneous Army of the Middle East included many disciplined self-reliant troops accustomed to hot climates and tropical diseases but, on the other hand, there were large groups who either entered it as local raw recruits or arrived from other countries and climes unprepared for the special hazards of the desert and delta and the Mediterranean littoral. Attitudes to the importance of disease and to the need for high standards of health and cleanliness consequently varied considerably. There were units with a high degree of discipline, actuated by the belief that their sick rate could be controlled, and others still accepting dirt, defect, disease and death fatalistically. A mixed problem of training, education and propaganda was thus presented. Many units and individuals had the right principles but not sufficient practice to safeguard themselves fully or to achieve the maximum of physical and mental well-being. Others were simply contemptuous of real soldiers bothering themselves with anything so childish or mundane as killing flies, avoiding mosquitoes or being particular as to the state of cleanliness of their camps, kitchens or their persons.

As far as possible, British principle and method were used, partly because the vast bulk of the Middle East Force was of British origin, partly to secure the advantages of uniformity and partly as these were known by previous experience to be suited to the local problems. Conversion of the potential and actual leaders of the Army to the importance of hygiene led to special emphasis to its principles being given in courses for staff officers and in the programme of officer training units. Formal training was undertaken by one specially established institution—The Middle East School of Hygiene—and by hygiene officers and field hygiene sections in each Force and Area. The School of Hygiene accomplished an enormous programme. There were formal courses of lectures and demonstrations held each month for groups of medical officers, regimental officers and non-commissioned officers, and rank and file. The subjects taught covered hygiene in all its aspects, field sanitation and water control. Drawn from the Eighth and Ninth Armies and from each base and other area, nearly 200 individuals a month passed through these formal courses, to return to their units, it was hoped, as disciples of the gospel of hygiene. This was important work and enabled modern hygiene method and knowledge to be quickly disseminated throughout the Middle East. But over and above such set programmes the School was continually filled to capacity with groups gathered together informally. These were of all kinds. There were medical and hygiene officers newly arrived, others standing by for new appointments, combatant officers, sanitary and water duty personnel from local units and many others. The School also helped in the initiation of non-British formations into local hygiene methods. Cadres from Polish, Belgian and other allied groups were trained for this purpose which, in their turn, established hygiene training units in their own forces. The teaching was naturally severely practical but kept dynamic and up to date. This was achieved by the constant contact the School maintained with field problems and by a programme of research and investigation. Many outworn practices and principles were revealed and discarded and more rational methods substituted. For example, in the case of excremental disease, a major cause of wastage of man power, methods of prevention were rigorously reviewed. As a result fly control was scientifically planned and proper methods taught, such as the destruction of breeding material in improvised incinerators and by the harmless disposal of human faeces in the famous incinerator petrol-tin latrine. This converted a previously difficult problem of latrines in the desert to a simple one. Fly traps were evolved which when placed *away* from cookhouses and mess-tents and baited with moist material *did* reduce fly populations and divert flies from contaminating food.

Considerable ingenuity was achieved in improvisation without which field units especially could scarcely have carried out their sanitary functions. The four-gallon petrol tin and the

44-gallon oil drum were transformed into incinerators, grease traps, cookers, fly traps, disinfectors, shower baths, food containers, refuse receptacles and many other useful pieces of apparatus. The School played a major part in inventing, standardizing, and popularizing these useful devices. On a smaller and less formal scale, instruction in field sanitation was included in the programme of all field hygiene sections. For the purpose these units prepared demonstration grounds in which were shown full-scale models of all types of sanitary apparatus.

Full use was naturally made of all hygiene and medical officers in educating units in the importance of hygiene. Thus it was obligatory for these officers to give lectures on such subjects as malaria control and venereal disease prevention, and many others.

In the general distribution of knowledge, and in securing the adoption of uniform methods, all the usual channels were used by medical headquarters. Precise instructions and orders covering food, general sanitation, infectious disease control, such specific diseases as typhus, malaria, venereal diseases, etc., appeared at intervals both in the Middle East Standing Orders for War and in regular General Orders.

However, health achievement is so essentially dependent upon individual co-operation that modern methods of propaganda were accepted as important in educating the officers and the men in the principles of health and disease control. For this purpose use was made of the public press, pamphlets, leaflets, posters, etc. In the early stage of the campaign leaflets of a formal type were issued dealing with such subjects as fly control, typhus, malaria and venereal diseases. Later, fortunately, the illustrated "peppy" publication called "Army Illustrated Magazine" ("A.I.M.") appeared. This had a form similar to such popular magazines as "Lilliput," and "Men Only," and its presentation of material followed lines suggested by psychologists. All Army subjects were reviewed in it, such as armoured fighting vehicles, mountain warfare, combined operations, supply systems, etc. These were treated in a simple, bright, concise way and were profusely illustrated. This magazine was eagerly included in the machinery for Army health education. Articles, cartoons, quizzes, covering general health training, physical fitness, fly and mosquito control, and first aid, were published during 1943 and gained much popularity. Posters have had only a limited success, due to the spate which flowed from all Army departments. The hoardings of the Middle East were covered with brightly coloured symbols of various aspects of national savings, salvage, careful driving, health protection, etc. This profusion made it impossible "to catch the eye" with any particular poster. However, several health designs covering typhus, flies, mosquitoes, camp cleanliness, were distributed. In their development much was learned from a study of the many excellent American hygiene posters. Hygiene education films have been disappointingly poor. With the exception of the Walt Disney colour film on "Mosquitoes and Malaria," and the South African venereal diseases film "Two Brothers," the films in the Middle East were dull and often out of date. As everyone today is attuned to the extremely high technical standards of the modern entertainment cinema any less quality in educational films has a bad effect. More harm than good is done as bad presentation is subconsciously accepted as evidence of the subjects themselves being inferior. There is a distinct need for the film to be taken more seriously as a means of public education in health. Sufficient funds and professional direction are required if the attention of the public is to be caught and its education in these fields so obtained.

There is much competition, naturally, in the Army for the more useful but limited channel of education available in special C.-in-C.'s orders or letters, leaflet inclusions in the soldier's pay-book, and in such popular Army papers as "Parade." Health education managed to secure a fair share of these.

Letters were sent to senior Army commanders requesting their special support for anti-malaria and anti-V.D. measures. The conversion of senior Army and formation commanders to the importance to their operations of preventing disease and enhancing health had probably the best of all propaganda results. Such leaders soon influence their men. Several enthusiasts were enrolled amongst these exalted people—in certain cases their accretion to the cause being helped by visual demonstrations of the destructive power of disease, as for example by malaria in Sicily. Arresting facts which convinced many senior combatant officers of the

importance of health in developing an effective army were the statistics of previous campaigns as well as those of the Middle East, demonstrating that loss of man power caused by disease and defect exceeded by many times that due to battle weapons. This data was included therefore in several articles and circulars. One group which were perhaps not as successfully converted to preventive medicine and positive health as might have been possible were the medical officers themselves. An inertia in this class, or possibly a mental orientation inclined too much towards clinical practice, resulted in it not always being a very positive agent in dispersing health knowledge. Many medical officers still are too satisfied with a prescription or an incision as the beginning and end of their functions. Yet the ultimate full understanding of the power of preventive and positive medicine by the Army lies largely in the hands of its unit medical officers. The more they practise and preach its principles the fitter will be the Army.

#### D. MAN-MANAGEMENT—MORALE—WELFARE—REHABILITATION.

It is perhaps not yet fully appreciated either by lay or medical opinion how comprehensive Army hygiene now is. Gone are the days when it was solely pre-occupied with infectious disease, sanitation and water supplies. It now accepts responsibility for studying all influences likely to enhance or undermine the vigour, fitness, well-being and efficiency of the soldier. In a phrase, man-management is now included in the province of modern military medical services. In this section, therefore, some of these factors as affecting the individual in the Middle East will be discussed, but others, such as food, deserving fuller treatment, will be treated later.

(1) *Acclimatization*.—The Middle East, as already mentioned, provides a variety of physical conditions. Nevertheless, its tropical features were the most prominent in considerations of the health of the troops during 1942 and 1943. However fit physically and mentally men may have been on leaving such home territories as the United Kingdom, they were not accepted as ready for immediate battle on arrival in the Middle East. Accordingly a period of acclimatization was arranged, usually four to six weeks, in the Canal Area of Egypt, before formations were passed on to any active role. This allowed physiological and, frequently, though not by design, an immunological adaptation. On the first count, the body and mind became attuned to heat, glare, dust and the harsh environment of vast desert landscapes. Secondly, in spite of care, many newly arrived units suffered from enteritis, sandfly fever and sunburn. Occurring in the settled conditions of base camps, not much harm resulted. If, however, troops had suffered these disabilities in action, serious consequences to the strategy and tactics of the forces concerned might have followed. A "salting" process occurring in base camps was, therefore, not altogether a disadvantage.

Though heat was the influence affecting most troops, many groups required care in winter. These were the large numbers from such tropical and semi-tropical environments as Central and West Africa, Southern India and Ceylon, the Islands of the Indian Ocean and the deserts of North Africa. It would have exposed such personnel to serious risks to have drafted them direct on arrival in winter to areas with almost Arctic conditions of rain, snow and cold, such as are found in the mountains and plains of the Lebanon and Syria, or even in some parts of Palestine. A medical classification was therefore given to the General Staff as to the regions in which these tropical troops could be employed. This took into account not only their tropical or semi-tropical origins but also whether such troops came from rural and primitive conditions or from sophisticated urbanized communities. That rural people take less kindly to changes of social circumstances and, if from the tropics, are usually chronically infected with such diseases as malaria, hookworm and schistosomiasis, were factors not overlooked. The classification was roughly as follows :—

(a) Indians from hilly provinces, Syrians and Lebanese could be employed in the same areas as European troops.

(b) Basutos, as they came from a plateau with a cold winter, after a winter of acclimatization in the Middle East, could also be employed anywhere, but should always be kept under medical observation.

(c) Mauritians and Seychellois after winter acclimatization could be utilized in any location.  
 (d) Africans from East Africa, the High Commission Territories, the Congo and West Africa, and Indians from the tropical areas should have careful acclimatization in Egypt or the Plains of Palestine before exposure to winter in Europe or in Syria. In addition, these troops were not to be used in areas with a prolonged winter of rain, snow and frost.

That this medical concern in acclimatization was justified had proof in summer and winter incidents. The crisis of the retreat to El Alamein in the middle of the summer of 1942 brought reinforcements rushing to the Middle East. The "Queen Mary" arrived at Suez jammed with troops. Their disembarkation and move to transit camps took place in extremely hot trying conditions resulting in a large number of heat-stroke cases. Then in the winter of 1943 several Pioneer Companies of West Africans were employed in wet winter conditions on port duties at Benghazi and Tobruk. There was a consequent high incidence of lobar pneumonia, but the exhibition of sulphonamides prevented fatalities. With the exception of these two minor incidents, the vast bulk of the force during 1942 and 1943 had an uneventful phase of acclimatization. This adaptation, assisted by the measures to be described in the next two sections, gave protection in a high degree from the deleterious summer and winter physical effects.

(2) *Heat and Light Effects.*—Heat was most dangerous when troops were newly arrived in the Middle East. The journey up the Red Sea followed by a slow tedious disembarkation into landing barges and a journey of some distance to the camping areas strained new troops to breaking point on occasions, as in the case of the S.S. "Queen Mary" already referred to. Liners of the North Atlantic route, such as this, were particularly unsuitable for use in the tropics, and so aggravated the hot conditions of the Red Sea. That overcrowding of troopships, owing to the serious shipping state, could not be avoided, was recognized. However, to minimize heat effects, every endeavour was made to increase ventilation, to allow the full use of decks, to reduce physical exertion on day of landing, to provide full drinking water supplies and to arrange for the early detection and treatment of symptoms of heat exhaustion, both on the ship and at the landing stage.

In so far as general service in the Middle East during 1942 and 1943 was concerned, no special heat problem arose. General instructions were issued to all units, giving in simple language, the part played by high air temperature, high humidity and still air in causing a strain on the body-cooling mechanism. Attention was directed to the need for avoiding the sun as far as possible in very hot areas in the heat of the day and for wearing head-dress. Strenuous work was, during this period, to be reduced to essentials. Regular bathing and the wearing of loose open-necked clothing were recommended. Generous amounts of drinking water to which salt was added in the proportion of  $\frac{1}{4}$  teaspoonful to 1 pint of water were to be taken. Allowance was also made in the ration scale for the amount of salt per man per day to be raised in summer from  $\frac{1}{2}$  to  $\frac{3}{4}$  ounce in areas where heat was excessive. Anxiety as to heat exhaustion occurring in crews of armoured vehicles was not unnatural. Surprisingly enough this was not a major hazard. The absence of cases of heat stroke or heat exhaustion in tank crews from the summer battles of the Western Desert was practical proof of the experimental work done on the subject by No. 1 Medical Research Section. This had shown that, though katathermometer readings reached alarming heights inside a stationary tank in the open, the starting of the engine, thus operating the tank's ventilating system, drew sufficient air through the vehicle to maintain an adequate cooling action on the bodies of the crew. That armoured vehicles would not provide problems in other conditions, say, in jungle warfare, was not to be deduced from Middle East experience. It was the low relative humidity of the desert air which protected the body's cooling mechanism. Other problems of heat arose in workshops, factories and such installations as base laundries. During the heat waves ("khamseens") of early summer, conditions were often almost intolerable, especially at night under "black-out" restrictions. Only general measures of improving ventilation, providing ample drinking water, etc., could be applied in these instances. Air-conditioning would gladly have been used if the machinery had been available, but only one or two plants

could be obtained. These were installed in such essential premises as the G.H.Q. telephone exchange, and the hospital at Massawa, probably the hottest station in the Middle East. The excessive sunlight as judged by Western European standards produced a demand for general issues of tinted spectacles. This was resisted on the principle that the average human eye is capable of an enormous range of adaptation and could meet most conditions of the Middle East. Naturally such units as A.A. with a special need to overcome direct glare were given tinted eye-shields. Sunlight almost certainly seemed a strong ætiological factor in the causation of desert sores.

(3) *Cold*.—The planning for the possibility of operations in the Caucasus or the Turkish plateau when the Germans were sweeping on to the Caspian in 1942, led to the examination of clothing, rations, frost bite, "trench" feet, and such matters in relation to cold climates. A special cold climate ration scale was prepared providing over 5,000 calories per man per day. Stocks of warm clothing, including "sou' westers," leather jerkins, gum boots, etc., were gathered. Orders were issued as to measures to combat frost-bite and "trench" feet. The use of foot soap and foot powder was laid down in these orders and the necessary quantities were stored. These preparations became unnecessary with the Stalingrad defeat of the enemy and his failure to make Turkey a battleground.

Though no extreme Arctic conditions were met by the Middle East Force, it had to deal with severe winters in the Lebanon. As quickly as circumstances allowed, troops in these areas were moved from tents into stone, brick or other type of hut, five blankets per man were allowed, and such extra items of clothing as woollen vests, extra pairs of boots, leather jerkins and cap comforters were issued. The various local medical authorities were also warned of the susceptibility of primitive non-immune troops from tropical areas to respiratory conditions, and of the need for special supervision of their food, clothing and housing. As mentioned above, West Africans in Cyrenaica experienced an outbreak of pneumonia in the winter of 1943. Generally, though, cold caused no serious impairment of health or efficiency.

(4) *Clothing*.—Soldiers' clothing has many aspects which concern his health and protection from harmful agencies. The troops of the Middle East had summer and winter outfits. That of summer consisted initially of a drill open-necked shirt, shorts and slacks, while in winter the dress was the well-known battle-dress. Head-dress early in 1942 consisted of either the topee or forage cap. Various modifications were made during the two years. A steady medical campaign for the abolition of shorts had only a partial success, when late in 1943 the ratio of 2 pairs of shorts to 1 pair of slacks was reversed. The use of slacks was made obligatory only in operational areas. The medical case in favour of slacks and long-sleeved shirts only was based on the following arguments:—

(i) The larger the skin area covered the greater the protection against insects including such vectors of disease as the anopheline mosquito and the sandfly.

(ii) Exposed skin showed a much higher incidence of the so-called desert sore—the vague heterogeneous group of skin ulcerations arising out of the combination of such agencies as slight skin injury, fly contact, dirt and sand impregnation, and sunlight.

(iii) Burns always affected exposed areas such as face, hands, forearms and knees most severely. Ordinary clothing was found in tank fires to afford a high degree of protection against flash burns.

(iv) If gas warfare developed, the more skin covered by clothing the better.

As the war progressed, sources of clothing changed and materials had to be examined before accepting new contracts. Thus the summer issue was changed to include bush shirts. Both the design and material of these, in early issues, were objectionable. The soldier disliked the untidy shapelessness of this garment and medically its loose thin texture was criticised, as it allowed mosquitoes to pierce through to the skin. Head-dress underwent changes too. The topee except for small specially exposed groups in the hotter areas was abandoned without any harmful sequelæ. Footwear gave no trouble except in locally enlisted A.T.S. girls. Here racial foot characteristics made the usual English ranges of shoes too limited. By increasing types and allowing made-to-measure shoes in certain cases this difficulty was

overcome. The Brinje Vest, i.e. a vest made of string, was considered in the Middle East as a protective both against excessive heat and cold, but supplies were not received. Generally, the very extreme climatic conditions for which the Brinje Vest is especially useful are only occasionally met in this region.

(5) *Equipment*.—A large proportion of equipment used was of standardized British Army types. Modifications were required in but few instances to meet Middle East conditions. The chief medical interest was associated, therefore, in locally-made equipment. Local production eventually became an important Middle East function, and many matters were referred for technical medical advice and opinion. Water containers, which were the solution of the problem of supplying rapidly advancing troops in the desert, were obtained by the use of 2-gallon and 4-gallon petrol tins and initially also of the captured 2-gallon jerricans. In the case of the petrol tins, confirmation had to be obtained of their freedom from soluble lead. Later when petrol came to be transported in terneplate, i.e. lead plated sheets, containers, special attention was drawn to the dangers of using these for storing food or water or for converting them into cooking utensils. Local equipment such as food plates, cutlery, hair and shaving brushes, blankets, tentage, camp furniture, required medical opinion as to its suitability or influence on the health and welfare of the troops. Wherever possible, trials of new or modified equipment were made. In this way useful data was collected on the design of helmets, web equipment, and anti-mosquito clothing.

(6) *Morale and Welfare*.—In the Army in this war, "hygiene" has accepted a watching brief over the morale and welfare of the troops. It is an extremely large and important subject deserving a report to itself, but here only its salient features and certain illustrative examples can be given from Middle East experience. Fundamental to morale and welfare are freedom from disease, good varied food, satisfactory clothing and housing. These general aspects are described in separate sections of this account. However, over and above this minimum, much was done with the special object of enhancing morale. In the sphere of amenities, hygiene authorities added their support to the demand for sport and recreation for the troops. Swimming was stimulated. Many units had the benefit of proximity to the Mediterranean. For others inland baths were constructed. Chlorination of these was undertaken under the supervision of local hygiene personnel. Sports grounds were developed as quickly as possible. Football had the widest appeal, being played by Europeans, Africans and Asiatics. Apart from amenities provided by voluntary agencies, canteens, rest huts, etc., were an official feature appearing early in all permanent or semi-permanent camps. Many of these competed in originality of layout, brightness of decoration, and in comfort and cosiness with any peacetime restaurant or "local." In order to maintain scrupulous cleanliness of kitchens, dining halls, ablutions, etc., all such institutions received regular scrutiny from local hygiene officers. In the leave camps that were established in Tripolitania, Egypt, Palestine and Syria, every care, too, was taken to enable the residents to escape from the Army atmosphere. Apart from such physical provision, facilities for mental relaxation were developed as time went on. There were mobile cinemas, libraries and concert parties, which, reaching forward areas and remote isolated detachments, were a direct fillip to morale.

In the normal course of their duties, hygiene officers took note of any such factors as delay in receiving home mail, lack of equipment, food, cooking apparatus, etc. Such defects were then brought to the notice of the appropriate authorities.

(7) *Rehabilitation and Optimum Use of Man Power*.—Where every man-hour is important, the responsibility of the Army hygiene authorities did not stop at keeping personnel fit and free from disease. It extended its functions to reducing to a minimum the period after hospital discharge before a soldier returned to duty and, secondly, to placing every man, especially those not fully fit, in the most productive employment. In regard to the first aspect all long-term patients from hospitals went to convalescent depots. These institutions are not places where a soldier follows an aimless, lazy life for a few days or weeks. Each patient is guided into a carefully planned existence of feeding, occupation, exercise and, in a few instances, special medical treatment, designed to restore his health, vigour, and function as

rapidly as possible. The Middle East was fortunately possessed of several excellent Convalescent Depots caring for various categories of troops. Situated mostly in excellent seaside spots, an ideal environment was provided. Each had the advice, too, of a specialist in physical medicine and a team of physical instructors and masseurs to carry out remedial exercise, restoration of muscular and joint function, hardening of physique, etc. The physical hardening process continued when the ex-patient, leaving the convalescent depot, passed to his base depot awaiting return to an active useful life. The Senior Medical Officers of these depots, advised by the staff of physical medical experts and psychologists, ensured that each soldier was brought to the highest pitch of fitness, and received any final medical treatment or such apparatus as dentures, glasses, special boots, etc. In addition, any soldier examined here by a medical board and classified as lower than A.1 came under the system distributing personnel into categories of employment most suited to their particular standards of fitness.

The Army possesses a vast system for the continual checking of fitness of all those classified, at some time or another, because of eye, foot, muscular, dental or general medical condition, as temporarily below par. In the Middle East all men in medical categories B and lower were reviewed regularly. Thus it was possible to comb out fit men from base and L. of C. jobs for meeting the insatiable demand of operational units. Medical advice was necessary also in utilizing the regrettably large group of personnel with permanent physical or mental inadequacies. The medical categorization adopted for the British Army as a whole required certain sub-classifications to meet Middle East conditions. Thus a class of so-called "Restricted Posting" was introduced, composed of individuals whose defects necessitated their use in limited kinds of work only. Specialists and boards handling these cases indicated in their findings the work or employment considered suitable. The personnel authorities then made postings accordingly.

In this section covering man power, some slight indication has been given of how Army hygiene in this war, as exemplified by Middle East practice, has taken a direct interest in enhancing the efficiency of the individual and, once having secured the optimum, has directed him into that occupation where he is likely to make the best of his available physical and mental capacity.

#### E. WATER SUPPLIES.

The excellence of the supplies developed and maintained by the Engineers in Base and L. of C. areas, and the adequacy of equipment for purifying and transporting water to troops during the various moves in the Libyan and Tripolitanian deserts, relieved considerably the anxiety of the medical authorities in connexion with water.

In Egypt, a most comprehensive system was quickly extended along the vast camps up and down the Suez Canal, and along the desert area to the North of the Sweet Water Canal. The other noteworthy engineering feat was the coastal military supply, by which water was carried across miles of desert from Alexandria for the Eighth Army in its various phases of advance and retreat during 1942 and 1943. This vast system was a monument to the energy and capacity of the Engineers. At suitable points along the Sweet Water Canal water filtration and purification units were erected. Into these, water from the Canal was pumped. Passing through rapid sand filters after alum treatment, sediment and gross impurities were removed. Chloronomes then discharged chlorine into the emerging flow sufficient to raise the free concentration of the gas to 0.2 part per million. An extensive reticulation system with various booster pumps and holding reservoirs conveyed the water over the enormous area of the Army camps in the region of the Canals. In Cairo, water was obtained from the civilian supply. Thus for base units in Egypt, medical supervision was reduced to a minimum. Throughout the two years no breakdown in this system occurred, and so literally hundreds of thousands of men received drinking, cooking and ablutionary supplies in a satisfactory manner.

The Eighth Army supplies called for more medical concern. As the distance westward into the desert from Alexandria increased, so sweet water in adequate quantities became



more difficult to provide. The pipe-line was pushed after the advancing elements as rapidly as possible on both occasions that the enemy was pressed back into Libya. In spite of the size of this system the quantity of water could not be raised above approximately one and a half gallons per man per day. To relieve the pipe-line therefore, and to seek additional means for increasing the supply, every local well and other source was investigated and, if at all acceptable, exploited to the maximum. Ancient Roman subterranean aqueducts at places like Mersa Matruh and other coastal sites were opened and made to contribute. For these isolated supplies from wells and aqueducts much hygiene supervision was demanded. Initially the purity, salinity and other factors were assessed, and means of purification defined. These almost invariably were superchlorination using Army water sterilizing powder (bleaching powder) followed by de-tasting with sodium thiosulphate. At many sources units had to rely on their own treatment of water. Here a hygiene assistant gave instructions as to the proportion of the sterilizing powder to be added. This practice was inefficient in that the addition of the sterilizing agent to small variable collections of water was difficult to regulate. On seeking a solution to this problem the Middle East School of Hygiene evolved a chlorine dosing tap which will be mentioned later.

There were two annoying aspects of the water problem in the Eighth Army which concerned hygiene officers. The first was the excessive salinity of desert wells. Many such supplies gave readings of over 200 parts per 100,000. It was surprising, therefore, that many tolerated water with up to 250 parts for even weeks without untoward effects. However, excessive salinity was reduced wherever possible by mixing such waters with sweeter supplies from other wells or with water transported from the pipe-line. The second problem was that of water sources damaged by the retreating enemy. Apart from physical destruction of wells and their equipment, the enemy polluted them with human and animal bodies, diesel oil, kerosene and filth of all descriptions. In addition to the clearance of gross materials these supplies were rendered fit by continuous pumping and sterilization with excess of bleaching powder. No instance of deliberate specific poisoning by the enemy using arsenic or other agents was discovered in the desert campaigns.

In the other areas of the Middle East, such as Palestine and Syria, the supply of water involved little for the medical authorities other than orthodox supervision and testing. In most areas local civilian supplies met military needs. Where the Army was not satisfied with civilian standards it provided its own safeguards in such form as local chlorination before distribution to units. Civilian supplies used by the military frequently owed much to Army engineers for augmentation and for supplies of apparatus and water chemicals. In Asmara, in Eritrea, for instance, a previously inadequate and uncertain water supply had its permanence ensured by several new reservoirs built by Army engineers.

The mobility of some phases of modern warfare has evoked a miscellany of water apparatus for use in the field. From the simple water-cart there has now been evolved a series of mobile water purification plants. Units such as battalions were self-contained when possessed of the standard Army water-truck. Equipped with the modern metal filters of the Stellar or Meta type such trucks were capable of supplying up to 200 gallons at a filling. Each truck is supplied with a testing box and the necessary chemicals of kieselguhr, water sterilizing powder and taste remover tablets. A dangerous tendency of units when at the base, and therefore drawing on command supplies, was to allow the maintenance of their water-trucks and the training of personnel in the use of such apparatus to lapse. Early in 1942 inspections showed that many units, if suddenly thrown into action, and therefore possibly on to their own resources for securing water, would have been seriously handicapped through their water-trucks being out of working order and with no one trained to deal with water apparatus. This unhappy discovery led to all water apparatus being brought into good repair and a direction to all medical officers to discharge their responsibility of having their units prepared with efficient apparatus and trained personnel. Another item of water apparatus which was available, but in this particular theatre not much used, was a portable filtering apparatus consisting of a standard metal filter and hand-pump mounted on a tripod. A few

of these units were carried by the Eighth Army and were available for supplying small detachments as they could deliver water at the rate of 100 gallons per hour. For the mass handling of water supply in the field the Engineers fortunately possessed several large units capable of handling quantities of water up to 3,000 gallons per hour. One such type was mounted as a trailer but others were self-contained mobile units. In these large-scale water purifiers filtration was done through a series of metal filters in the usual way but purification depended not on chlorination but on chloramination.

In discussing the difficulties of dealing with small quantities of water at isolated water points, it was mentioned that the M.E. School of Hygiene had evolved a simple method of regulating chlorination. This consisted of an ebonite dosing tap attached to a suitable receptacle at the water point. In this receptacle was placed water sterilizing fluid made up to the necessary concentration. By turning the water tap an exact quantity of water sterilizing fluid was trapped in the tap and then discharged into the water container to be treated. Depending on the size of the water container one or more turns of the ebonite tap were made to provide sufficient water sterilizing fluid to purify the contents.

One further aspect of water apparatus requires mention. This refers to the colossal scale on which water containers improvised from petrol cans, "Jerricans" and "Americans," were used to carry water forward during the advances of the Eighth Army in the Western Desert. As petrol containers were the source of the majority it was necessary for the medical authorities to ensure that no harmful contamination would arise by carrying water in them. It was known that one type of these containers was made from terneplate. Also the majority of containers had been used to transport petrol of a high octane. Various experiments were therefore carried out to determine whether water in such containers would take up lead in dangerous quantities. The terneplate containers were rejected *in toto* as, being lead covered, giving off dangerous quantities of lead in solution. The other containers, however, unless badly soldered, were accepted for water purposes, provided they had been thoroughly washed out so as to remove all traces of high octane petrol. Bituminizing the interiors was later adopted. It was fortunate that at no time was there any anxiety about stocks of chemicals required for the various water supplies. Chlorine gas, water sterilizing powder, alum, kieselguhr and de-tasting tablets were always available in quantity. In addition, large stocks were held of Halazone tablets for use by any formation having to depend on its water-bottles for collection and purification. On behalf of the War Office the M.E. carried out several series of tests of the new Halazone tablet and confirmed that it retained its strength of liberating up to 8 parts per million of available chlorine after storage for two to three months in the M.E.

That the water supply to the M.E. Forces using the above methods was not harmful is demonstrated by the fact that no outbreak of water-borne disease occurred. However, on one occasion, the Army was concerned in protecting itself against water-borne enteric in Malta in May, June and July, 1943. This was an extremely interesting example of water-borne disease. Enemy bombing had fractured a water main, a fact, however, which was not known at the time. No harm resulted until some months later when, in the process of clearing an aerodrome, a "bulldozer" broke a sewer alongside the previously damaged water main. This allowed crude sewage to enter one of the principal water mains supplying certain villages and a section of Valetta. From this combination of accidents there resulted an exceedingly severe civilian outbreak of typhoid with several hundreds of cases. With the exception of a few cases of Maltese soldiers the Army escaped. This remarkable fact is attributed not only to the protection given by T.A.B. vaccine but also to the arrangements made, immediately the contamination of the supply was known, to purify at distribution the water used by the Army. This, with direct control and discipline, was more easily and expeditiously done in the Army than in the civilian population.

#### F. Food.

(1) *General Policy.*—To achieve proper feeding of an army is one of the most complex problems perplexing military administrators. The basic difficulties were increased many

times in the case of the Middle East Force, especially in the years 1942 and 1943. All those factors of race, climate, religion, etc., discussed in the first section of this paper, influenced the subject of food. But there were others. As shipping became the crucial consideration in the general war economy in 1942, the method of stocking the Middle East larder had to be reviewed. Then, in addition, the Japanese successes in capturing Malaya and the Dutch East Indies, and their direct threat to India and Australia, shook the whole supply system of the Middle East. Not only had imported supplies in general to be reduced drastically, but India and Australia in the dark early months of 1942 had to be discounted to a large extent as a continuing source of such important supplies as rice, flour, meat, oil and canned goods.

Though it was the policy of the Middle East Command from the outset to become as self-supporting as possible, the events of 1942 lent extreme urgency to the process. The quantities of flour, frozen meat, oatmeal, rice and the large range of canned goods, which the Army previously had obtained from overseas, had to be replaced by local products. This was not easy, for the whole Middle East agricultural and industrial production, already taxed by civilian demands, was also denied access to normal peacetime supplies. It was necessary, therefore, as a first step, to expand existing and create new local sources. This in turn called for more agricultural seed and machinery, industrial plant, and such items as tin-plate, nearly all of which had to come from overseas. However, through the stimulus and co-ordination provided by the Middle East Supply Centre under the Minister of State, Mr. Casey, this immense and complicated task was accomplished. Thus, with but little friction or dislocation, the Army adapted itself to a new system of food supplies, where imported products of meat, oil, cereals and canned goods were replaced with similar or allied products coaxed out of expanding or new local ventures. Though much manipulation of types of foodstuff was demanded, and a slight reduction in quantities was unavoidable, the soldier did not go hungry, nor did his health in any way suffer.

The complexity of Army food problems led to the creation of the Middle East Ration Committee. Consisting of representatives from the Supply, Medical, Catering and Financial Services, it handled the continuous stream of questions on ration scales, food preparation methods, substitution of imported items by local products, seasonal changes of supply, etc. Charged with adapting the Army feeding to the change in sources of supply following strategical developments all over the world, the Ration Committee bore the heavy responsibility of reducing ration scales and introducing new and frequently untried local foods to replace those unobtainable from overseas. With the constant change in the composition and function of the Middle East Forces, the fluctuation in the fortunes of its campaigns, the varying supply situation and the shifting scene of operations from the desert to Sicily and the Mediterranean Islands, the work of the Committee never reached finality. The measure of its success is not to be found solely in the health and vigour of the troops, but also in the fact that the soldier himself, with negligible exceptions, did not grouse.

(2) *Some Medical Factors regarding Food.*—That the modern Army administrator grasps the importance of the medical aspects of feeding troops has been amply shown in the Middle East. In the creation of the various ration scales fundamental to the whole system and organization of obtaining, distributing and consuming food, the medical opinion was supreme. If a certain type or a fixed quantity of food was requested by the medical representatives, these demands were met. Only complete impossibility of getting any item was advanced by the supply authorities for not adopting any given medical recommendation.

In the construction of ration scales, an early difficulty lay in the lack of authoritative calorific, vitamin and salt values for the majority of foods. In 1943, a useful work was therefore performed by the War Office nutrition advisers in issuing a comprehensive table of generally accepted values for all the commoner food items. It became possible then to determine the value of the scales with considerably more confidence. These scales in number and variety are scarcely credible. During 1942 and 1943, over thirty-five scales were in use. They, as will have been deduced from the remarks above on the changing supply situation, rarely remained fixed for long. A ceaseless labour therefore went in checking their calorific

and vitamin values, quite apart from the stupendous task the fluctuation of such a large number of scales imposed on the supply services. It is only possible to give here some of the salient features of the medical aspects of the Army feeding in the two years. The scale which was used by the majority of troops, and which it was the policy of the Ration Committee to apply to as many categories as possible, was the Middle East Field Service Ration Scale. Originally, it had a value of 4,000 calories per man per day, but the "tightening of the belt," referred to above, brought it down to 3,700 for a short time in 1942. Nevertheless, it was soon increased to an approximate value of 3,800 in 1943. Its vitamin value when fresh items were supplied was, on a conservative basis :—

Vitamin A	..	4,000 International Units
Vitamin B <sub>1</sub>	..	550 International Units
Vitamin B <sub>2</sub>	..	1.5 mgm.
Nicotinic acid	..	24 mgm.
Ascorbic acid..	..	75 mgm.

Occasionally, on active operations or in areas where fresh supplies were difficult to get, certain so-called dry equivalents were issued. These were biscuits in lieu of bread, pressed meat, tinned fruit, tinned milk and tinned vegetables. Under such conditions, accessory quantities of vitamins were supplied. At first these took the form of marmite or yeast tablets and ascorbic acid tablets, but later a compound vitamin tablet containing :—

Vitamin B <sub>1</sub>	..	400 International Units
Vitamin B <sub>2</sub>	..	1 mgm.
Nicotinic acid	..	10 mgm.
Ascorbic acid..	..	25 mgm.

was available in large quantities. In the scale, proteins were provided in the form mainly of meat, bacon, fish, eggs, cheese and milk. Fat was not made prominent as local conditions obviously did not favour a high fatty diet. The chief fat item was margarine, but cooking oil was also provided. Bread, flour, oatmeal, potatoes and pulses were the main sources of carbohydrates. It was the austerity policy of 1942 and 1943 which reduced the quantity of frozen meat (imported from Australia), potatoes, oatmeal, rice and tinned food. Compensation was obtained by increasing bread, local fresh meat and cooking oil, as well as introducing ground nuts into the scale. The Field Service Scale was gradually adopted by the majority of groups, including the U.K., Dominion, Free French, Maltese, Mauritian, Cypriot, Greek, Polish and Yugoslav troops. Contrary to expectation, little difficulty was experienced by these troops in changing over to a scale basically designed for the taste of British troops. However, there were many other groups whose religious or racial dietetic customs could not be ignored. Indians were provided with a scale including atta as its bulk item, and such items as dhalls, ghi and Indian condiments. Africans from the High Commission Territories of South Africa and from East and West Africa were eventually placed on a single African scale allowing for the special desire for the bulkiness of mealie meal and bread. Ground nuts were a useful item in these scales in giving high calorific and vitamin B values. Sudanese, Libyans and Arabs were given a scale with a high content of local bread and cooking oil.

Incompatibilities were involved in producing the various so-called "Battle Assault" and special operational ration scales. Raiding and reconnaissance parties in the desert had to travel light and could not get water; assault troops in the opening stages of battles had to be self-contained for several days until the normal supply lines could be established; parachute troops could not expect supplies to get through to them for several days; and finally, tank crews in battle could not always depend on getting back to supply areas. These special ration scales created conflicting requirements. The need for mobility, freedom for fighting, the least bulk and weight in transport, for non-perishable readily-prepared foods on the one hand, clashed with providing high calorific, palatable, sustaining and refreshing meals. Modern food developments eased considerably the problem of constructing ration scales which had high caloric value, small weight and bulk, were non-perishable, and needed little or no cooking. Nevertheless, field experience has corrected the view that troops will subsist for any length of time on a purely concentrated artificial "tablet" diet. In time, various

operational scales were evolved. The "Battle Ration" used, for example, by the Eighth Army in its attack at El Alamein, had a caloric value of 3,100 and, besides the basic items of biscuits and pressed meat, included cheese, jam, tinned milk, vegetables and fish, and the ingredients for tea. The extremely efficient follow-up of supplies behind the advance, however, saved the troops from any long spells on the "Battle Ration." The limit of ten days laid down was never exceeded. Another scale of the type which met rather peculiar conditions was that used by the Commandos. In it, sugar, ground nuts, cheese, dried fruit, raisins, chocolate and tinned fish were very acceptable items, and proved satisfactory in many raids. In the Sicilian campaign occurred the first opportunity of trying out the pack type of ration. A composite 14-man pack ration had been prepared by the War Office to meet the needs of 14 men for one day, or 1 man for fourteen days. It contained a variety of items, all canned, which gave an energy value of 3,600 calories per man per day. There were dishes of sausage, steak and kidney puddings, meat and vegetables, fish and cheese. Experience in the Middle East of these various operational rations has shown the value of such items as dried fruits, ground nuts, boiled sweets, chocolate and tinned fish. These items are palatable for troops living strenuous, exciting lives for a few days, they are of high caloric value, and easily carried. No cooking is required. Ingredients for a hot drink, tea in the case of British troops, should always be included in scales such as these.

In all routine scales special care was taken to ensure adequate vitamin values. Wherever possible, this was done through the inclusion of sufficient quantities of "protective foods"—meat, milk, fruit and vegetables. The vitamin A content was maintained by using fortified margarine, cheese, milk, and fixing a minimum quantity of fresh or dried carrots and of first-class green types in the vegetable issue. Dried apricots were also specified in the dried-fruit issue. Red palm oil, which could only be got in small quantities, was added to African and Prisoners of War scales as an invaluable means of enhancing vitamin A values. The vitamin B series were the most difficult to provide. For this purpose, a proportion of either wholemeal flour or imported fortified B<sub>1</sub> Canadian flour in the Middle East flour mixture was fixed. Oatmeal, meat, milk, pulses and potatoes were depended upon, too, as sources of the B series. The ground nut was a very welcome Middle East dietetic item as it had not inconsiderable quantities of vitamin B<sub>1</sub>, riboflavin and nicotinic acid. The local market was accordingly exploited to its limit and ground nuts added to most scales. Vitamin C did not create any difficulties. Usually, fresh fruit and vegetables were available. The supply authorities, co-operating fully, enabled local contracts to be drawn up so that fresh vegetables of high vitamin A and C content were always selected in preference to such types as marrows, squashes, etc.

Both to add variety to the rations and to balance their vitamin content, such locally available items as eggs, fresh and smoked fish, kidney and liver were used wherever possible. When ordinary methods of supplying vitamins failed, the combined vitamin tablet mentioned above was a "stand-by" to ensure the adequacy of rations. Fortunately in the Middle East there was rarely any difficulty in maintaining satisfactory fresh supplies.

(3) *The Distribution and Preparation of Food.*—Experience of supervising the nutrition of an army has emphasized that having a properly balanced ration scale with sufficient protein, carbohydrate, fat, mineral salts and vitamins is but half the story. In the Middle East, medical supervision has been as much concerned in other aspects of nutrition as in calculating caloric and vitamin values. These have included defining conditions for the preservation of the value of fresh items, and for cooking and preparing food to protect its nutritional and hygienic qualities. It is of little use giving an Army unit satisfactory and sufficient quantities of meat, bread, flour, vegetables, fruit, etc., if it is incapable of transforming these into palatable, nutritious dishes.

Actually getting the Army to safeguard foodstuffs in transport from depots to units and to cook properly was a very thorny problem indeed. Fresh supplies suffer rapid deterioration in the field, intensified in the conditions of heat, dust and flies typical of a Middle East summer. A gigantic civilian army too, can scarcely be supplied in a few months with sufficient trained

conscientious cooks—cooks, too, who have to prepare food with few of the devices and apparatus available in an ordinary peace-time modern kitchen.

These various problems were tackled vigorously and not without success through the co-operation of supply, medical and catering authorities. The supply authorities for their part built up a system of clean, efficient depots, refrigerator vehicles and stores, mobile bakeries and butcheries, which brought food in a clean, fresh, wholesome condition right up to the doorstep of field units. Units, by education, example and occasionally coercion, were brought to a high standard in methods of collecting food from depots, transporting it forward and storing it in unit areas. Improvised food containers to carry and store fresh meat, vegetables, cereals, etc., were soon in the possession of most. Kitchens and food preparation quarters were eventually accorded proper hygiene respect and rigorous standards of cleanliness and orderliness applied.

In demonstrating the importance of the kitchen and the cooks in the economy of the Army, immense help has been received in this war from the Army Catering Corps. Their Schools of Cookery and their system of local catering advisers and inspectors produced in a very brief time a long-needed improvement in the type of man selected as cook, in his training and in his work. The Corps undertook, too, continual experiments and research with excellent results in the way of making field kitchens, ovens and other apparatus, and in methods of dealing with such items as rice, "bully," ground nuts, etc., so as to make them palatable to troops previously unaccustomed to these foods. In all its methods, the Corps gave full emphasis to medical recommendations for the preservation of vitamins in the storage and preparation of food supplies and to cleanliness in handling food.

The peculiar food problems of the desert and mobile armoured-vehicle fighting, resulting in wide dispersal of vehicles, units and men, have been treated in a previous article (Gear), so need no further reference now.

The feeding of patients in hospital had many exasperating features. The wide dispersal of wards, frequently over sandy desert country, made the transport of food from central kitchens a major problem. No completely suitable hot trolley or container could be devised. Then hospital kitchens, as all others, had to depend on oil as a heating medium. Lack of engineering supplies and personnel and the complicated control of oil burners left a largely unsolved problem of dealing with soot in these large-scale kitchens. However, by the end of 1943, the high place of cooks and kitchens in helping the Army to be fit and vigorous had been secured, and the handling of food at all stages from the depot to the mouths of the soldiers was efficient and cleanly. Food waste was so reduced that even an Oriental swill collector found little to extract from disposal receptacles.

(4) *Diseases associated with Food.*—Food deficiency diseases were largely conspicuous by their absence. This was a mark of the success achieved in constructing balanced ration scales and in getting food supplies properly distributed and prepared for the forces scattered throughout the Middle East. The only group in which avitaminosis occurred was that of Libyan Prisoners of War. Through certain circumstances, outside local control, their ration scale had to be changed. A theoretical sufficiency of riboflavin was allowed in the diet but, in practice, owing to a mixture of factors, including the racial method of food preparation, a deficiency apparently occurred. These resulted in widespread minor manifestations of ariboflavinosis, especially in the form of stomatitis and glossitis. The careful medical supervision continuously maintained soon detected the incipient condition. Treatment with milk and yeast produced early cure. Except for quite abnormal isolated instances, scurvy, pellagra and beri-beri did not occur anywhere in the Middle East Forces. As the present day medical practitioner is conscious almost to a fault of the possibility of food deficiency, it can be accepted that any cases in the Middle East would have been detected. Several surveys by medical heads of hospital divisions and by the Consultant Physician also failed to discover any food-deficiency disease. On the contrary, the men of the Middle East Forces were amazingly fit. They filled out, put on weight, showed bronzed glowing skins and indeed exhibited all the signs of well-nourished healthy beings.

Food poisoning inevitably made some appearances. Typically, the cause in most cases could only be surmised on circumstantial evidence. In most cases, the evidence led back to reheated food kept overnight. The comprehensive system of food inspection in depots and in the field served as an efficient screen against damaged food getting into kitchens. Intrinsically sound though the Army food was proved to be, it was nevertheless, in spite of all precautions, on occasions a vehicle of excremental disease, e.g. dysentery, enteritis and, to a smaller degree, typhoid. As will be elaborated in a later section, food, water and fly-borne disease was a major cause of sickness. Yet in the Middle East campaigns, owing both to general sanitary improvement, and to the better protection of food, these diseases took much less toll than in previous wars.

#### G. CARE OF THE PHYSICAL ENVIRONMENT.

In the section above on man-management, the efforts to provide physiological adaptation of the soldier to his new environment are broadly described. The attempts to modify and control some at least of the components of this Oriental and sub-tropical setting form the substance of the present section.

(1) *Siting of Military Communities*.—The three insects, fly, mosquito, and sandfly, had much to do with the placing of military communities, whether in camp, barrack or workshop. In having the large base, transit and L. of C. camps situated, for example, in desert areas such as Quassasin, Tahag and Amiriya in Egypt, and in country districts in other territories, the main uncontrollable sources of fly breeding, viz. native villages and towns, were largely avoided. However, the segregation of military populations as far as possible had other objects. It reduced contact with vendors of doubtful food and drink, and with such infections as typhus, smallpox, plague and venereal disease. These diseases in the military in the Middle East had a close correlation with civil urban communities, e.g. plague in Suez and Port Said, typhus and smallpox in Cairo, Alexandria and the Canal ports.

To revert to the influence of insects, it is not unexpected to note the major role played by the anopheline mosquito. As an initial guide to the staff, the whole Middle East was surveyed by the various malaria field laboratories. This showed areas broadly classified as highly malarious, malarious, and non-malarious. Wherever possible, military installations were naturally limited to the non-malarious regions. If for some strategic or operational need this could not be so, local malaria surveys secured the best site within the selected area and indicated the measures required to reduce the risk of infection. Amazing though it may be, the inclusion of medical representatives in discussions on such fundamental hygiene problems as camp siting was by no means accepted as automatic by Army staffs in the early months. However, steady propaganda eventually achieved this essential measure. One of the mental fixations that had to be removed was that the hazards of an area were static. Thus, Staff officers were inclined to think if they were supplied with a map showing areas classified broadly as highly malarious, malarious, and non-malarious, that these constituted a permanent fixed guide for all time in the future. They only slowly came to realize the peculiar local features of malaria, for example, and its characteristic fluctuations due to season, weather conditions, etc.

The sandfly produced some serious geographical problems. "Unsalted" groups suffered exceedingly when quartered in sandfly areas. Such an important institution as the Officers' Training Unit conducting intensive short term courses was at one time almost crippled by sandfly fever. Its transfer to a new site was seriously considered, but vigorous local control measures fortunately were sufficiently successful to avoid this. The coastal plains of Palestine and Syria, in addition to the areas around Cairo, had the most unenviable reputation in producing sandfly fever outbreaks.

Especially difficult problems in placing troop sites developed with the falling back of the Eighth Army to El Alamein in June and July, 1942. Forces were hastily gathered together for the defence of the Nile Delta, Alexandria and Cairo. There was no avoidance for them of the populated irrigated regions. They were subject consequently to the hygiene hazard,

already mentioned—flies, mosquitoes and too close contiguity to native communities. In addition the canals were a danger from schistosomiasis and general excremental pollution. Urgent orders and vigorous hygiene supervision were arranged to bring home to these troops the hazards of the Delta environment.

(2) *Sanitary Services*.—Having obtained as clean and as disease-free areas as possible, emphasis had then to be placed on their maintenance. This led to standards of camp and barrack cleanliness being made very strict and of efficient services of disposal for waste products being provided. By a combination of propaganda and discipline, camp and barrack cleanliness came, in time, to be excellent. This was no mean accomplishment, as the average urban-bred civilian soldier is by nature extremely careless of his physical environment. He has become accustomed to having litter, waste paper and night soil disappear effectively without any effort on his part. He has to have habits instilled in him so that he, first, himself does not add to the litter and filth of his environment and, secondly, personally feels a responsibility for cleaning it, even if someone else made the mess.

In the Middle East, sanitation was ever an important part of hygiene work and, in keeping with British Army practice, much ingenuity went in improvising apparatus and structures for burning refuse, treating waste waters and rendering human excreta innocuous. The general methods do not require description in this article as they are so well known, being found in all current textbooks of field sanitation. A few of the more interesting local problems and developments, however, deserve a few notes.

(a) *Bathing Facilities*.—As personal cleanliness is an important routine in promoting general bodily health, as well as in preventing skin diseases, persistent pressure was applied by the medical authorities in seeking adequate bathing facilities in all areas. In Base and L. of C. areas the matter was relatively simple. Here standard bath-houses supplying hot and cold showers were erected. The forward units, especially in the deserts, had too frequently no chance of general baths. Near the coast the sea was enjoyed by all and its usefulness increased by the issue of sea-soap. Much experiment and trial produced several improvised bath sets approaching the ideal, viz. light, easily transported and erected, sturdy and using little water. These were also an advantage in temporary camps and for such special tasks as dealing with refugees infested with lice. A large scale improvised bathing centre, formed from several of these special portable sets, overcame the difficulty of cleaning and disinfecting the scores of thousands of Italian and German prisoners taken in the El Alamein advance.

(b) *Refuse Disposal*.—Middle East experience has amply confirmed the advantage of incineration of garbage, refuse, etc. Mere burying is rarely done properly enough to prevent fly breeding. However, in forward areas, incineration on occasions could not be employed because of attracting enemy attention. In operation areas the general problem of waste disposal was much intensified by the enforced dispersal of men and vehicles. Early on, this had produced so-called vehicle cooking. Each group of men in a vehicle, troop-carrying lorry, armoured-car, gun or tank being isolated from their fellows came to fend for its own food. Apart from its evils of improperly prepared meals, dispersed vehicle camping also scattered refuse and waste products in an uncontrolled fashion over all camping areas in the desert. A policy was defined therefore in 1942 to return to company cooking, arguments securing this being both those in favour of preventing scattering of refuse and equally, if not more important, those emphasizing careful preparation of true meals instead of "feeding out of a tin." This eased the problem of refuse disposal in forward areas considerably and contributed much to lessening the fly nuisance.

In more stable base and L. of C. areas the handling of refuse approached civilian conditions. Wherever the size and siting of camps allowed, the controlled tipping method of disposing of refuse was adopted. The general recommendations of the Ministry of Health were followed, e.g. deposits made in layers of not more than 6 ft. 0 in. depth with each layer covered by at least 9 inches of earth and the whole process kept under the most rigid hygiene supervision. Following experience elsewhere, the method proved successful in the M.E. provided supervision was never relaxed.



(c) *Waste Water Disposal*.—One of the fortunate features of handling waste water in most areas of the M.E. is that the dryness of the climate and the strong sunlight results in evaporation methods being particularly successful. Wherever possible, therefore, waste water was run into a series of pans to allow this process of evaporation to take place under the optimum conditions. Each pan had a hard, smooth, level floor and was provided with a containing border of approximately 2 ft. Usually the workings of the pan system of disposal provided for the following schedule : Day 1—Pan filling ; Day 2—pan evaporating ; Day 3—floor of pan covered with film of mud, slightly smelling ; Day 4—mud adhering but dry with no smell ; Day 5—mud cracked and peeling off in flecks ; Day 6—dried mud flecks brushed off and packed on top of ridge and pan ready for use again.

In certain areas waste water was disposed of through irrigation channels by which quantities of excellent vegetables were obtained. It was remarkable to see, for instance, in the desert areas, how enthusiastic hospital O.C.s were able to obtain most excellent additional vegetable supplies by careful distribution of their waste water into desert vegetable gardens. This method was stimulated wherever possible. "The nigger in the wood-pile" of waste water disposal seems always to be the grease trap. In spite of much education, local engineering services frequently neglected this most important apparatus by constructing traps without the essential principles of adequate capacity and properly placed baffles and inlet and outlet pipes. This weakness too frequently was responsible for improper waste water disposal and serious insanitary conditions.

(d) *Night Soil Disposal*.—The present Middle East campaign has seen the vindication of a policy of using deep pit latrines wherever possible. During the years in question, all permanent and semi-permanent camps were converted to this system with obvious improvement over the previous bucket removal system. There were no particular novel features in the deep pits used but, as always in sanitary control, direct adherence was necessary to the principles of construction and maintenance, e.g. adequate depth with an absolute minimum of 8 ft., the provision of fly-proof superstructure, and constant inspection to remedy any wear and tear or carelessness in their use. A special problem in the maintenance of deep pit latrines, as with other camp structures, arose when large camps were temporarily unoccupied as it was quite impossible to provide sufficient guards to hold off marauding thieves. Latrine structures were damaged and contents exposed to fly breeding. In these circumstances deep pits were sprayed with a mixture of boiler oil and tar oil to prevent fly breeding. In the forward areas, especially in the Western Desert where the subsoil was of rock, making the construction of deep pits impossible, the problem of innocuous disposal of night soil was solved by the introduction of the incinerator latrine. For this, petrol tins were used as receptacles and twice daily incineration of contents was obtained by ignition of a small quantity of petrol and some oil. With careful maintenance one of these latrines was shown to last 15 men for a fortnight. The bore hole latrine had little application in the M.E. as troops were rarely sited in areas where such structures could be put down.

(e) *Fly Control*.—It is convenient to mention briefly some of the main features of fly control, the fly being one of the most irritating features of the M.E. environment. It was confirmed over and over again that, except where a unit was placed right in some civilian community, camps depended on freedom from flies on their own efforts. Camps with properly supervised refuse, waste water and latrine disposal could be as free from flies as any civil local authority equipped with full sanitary services. Therefore, in the campaign to eliminate the fly, emphasis was continually placed on these essentials. The results were completely satisfactory, as in the summer of 1943 the vast majority of Army communities were relatively free from flies and the average soldier had learned the lesson that camp cleanliness paid. The main problem arising in connection with flies, and one which threatened the fitness of the Eighth Army, was that associated with the retreat and the holding of the El Alamein line in the period from July to September, 1942. The disorganization following the retreat from Ghazala to El Alamein had produced a lowering of hygiene standards, disruption of hygiene supervision of camps and lines of communication, and a crowding together into the

area between El Alamein and Amariya of vast numbers of small units as well as hordes of Bedouin and native refugees. Literally appalling conditions of fly infestation developed. Flies were present in such incredible numbers that during daylight the men of the Eighth Army had no respite. For the fighting units in the forward lines this was an exceedingly serious matter as men, who during the night were awake on either guard or patrol duties, could get no rest during the day. General Auchinleck himself, therefore, backed up directly medical recommendations, which resulted in the refugees being cleared back from the camping areas and a special Fly Control Unit being organized to clear the whole area in and about the El Alamein defence line of fly-breeding materials such as dead bodies, litter, refuse, etc. In addition a vast quantity of mosquito netting was distributed amongst the men so that they could obtain peace for sleeping and resting during the day. These special measures fortunately were successful and by the end of September the problem had abated considerably with the fortunate result that excremental disease never seriously weakened the strength of the Eighth Army. As has been shown in a previous article (Gear), it was otherwise with the Germans and Italians in the same area, where indescribably filthy conditions produced such a serious fly menace that the incidence of dysentery, diarrhoea and enteritis materially sapped both the man power and vigour of the enemy forces.

One technical point of some interest and importance that M.E. experience has revealed is the necessity of subscribing to certain principles in using fly traps. These are : that the traps must be placed away from cookhouses, dining halls, messes and latrines ; they must be truly counter-attractions for flies to the above type of premises. Then traps must be of the proper size with full play allowed for light attraction and always properly baited with moist bait. Used in this way, it has been shown that fly traps literally do attract flies away from cookhouses, etc., and catch such enormous numbers as to lessen appreciably the fly population in the camp locality.

(3) *Type of Accommodation.*—In the early stages of the campaign, providing troops with accommodation was a difficult problem for the same reason that all problems were difficult, namely, lack of supplies and the necessity for improvising as much as possible. On the other hand the generally warm, sunny climate throughout most of the M.E. reduced the necessity for shelter. Initially, therefore, the majority of camps consisted merely of tents with fixed structures to serve as cookhouses and ablution and latrine blocks. This primitive provision, however, was improved with the increased availability of such materials as wood and cement so that gradually the more permanent camps came to have huts for all central services including cookhouses, messes and canteens, whilst gradually a policy of replacement of tents with huts for sleeping accommodation was pursued. Nevertheless, at no time was either labour or material sufficiently generous to allow of optimum standards being secured ; therefore, as a compromise, a minimum space standard of 45 square feet per man had to be accepted for sleeping accommodation in huts. Similarly, the numbers in tents had to be increased above those allowed in peacetime. The situation was carefully watched but no untoward effects in the form of a rising incidence of respiratory disease occurred.

There were three types of accommodation provided, governed by the two main factors—permanency of the camp and the availability of supplies. These types were known as tented, partially hutted, and fully hutted camps. Partially hutted camps were on a scale which supplied tents for sleeping accommodation and for messes, but huts for cookhouses, canteens, latrines and ablution blocks. Medical concern in the hutted camps lay largely in securing the adoption of standard designs covering billets, cookhouses, bath-houses, latrine blocks, and in the proper distribution and layout of buildings within the camp area. Wherever possible, hospitals were naturally put on to a fully hutted scale. Air-conditioned accommodation would have been a very welcome advantage, especially in Egypt during the summer months, but the extremely limited number of air-conditioning plants available prevented any general use of this principle. It was, therefore, limited to certain operating theatres and to the hospital at Massawa.

Though not entirely eliminated from Middle East military accommodation the notorious

bug is now right back on the defensive even in those historic haunts of his in Cairo, the Kasr-el-Nil Barracks and the Citadel. This has not been the result of any such magical insecticide as D.D.T., but of a rigid comprehensive regime followed by every unit itself dealing with bug harbourages such as wall cracks, regularly turning out into the sun all bedding and movable fittings, and regularly cleansing premises with paraffin emulsion.

#### H. PROBLEMS WITH RACIAL AND CIVILIAN FEATURES.

(1) *Allied Forces*.—It will have been gathered that the racial heterogeneity of the Middle East Force did not simplify hygiene administration. In most continental armies hygiene is scarcely recognized so that a considerable inertia and even opposition had to be overcome before most Allied formations would accept the necessity of having a hygiene organization or of following sanitary principles in laying out camps, taking preventive measures against disease, etc. A frequent argument was that the Army in question had to fight, that it was tough, and quite impervious to such minor afflictions as dirt, flies and disease. If the British were queer enough to worry about these things they should employ native labour to clean up camps and not submit real soldiers to the indignity of picking up litter! Some groups were never really converted. Their camps, bivouacs, etc., remained filthy, and the incidence of preventable disease confirmed their disdain of hygiene. A notable exception was the Polish Corps. Composed of soldiers evacuated in 1942 from Russian Turkestan, via the Caspian and Iran, it was at first disinterested, but by the time it went into action in Italy, its practice in sanitation, fly control, malaria prevention, was an example even to British regular units.

In most continental Allied armies the status, or rather lack of it, accorded to unit medical officers is not helpful in effecting hygiene control. In certain services such an appointment does not even carry commissioned rank. This lack of authority, combined with the absence of any direction giving commanding officers responsibility for maintaining the health and sanitary conditions of their units, raised almost insuperable obstacles to proper hygiene practice. On several occasions a unit medical officer, fired with hygienic zeal, correctly giving an adverse report on camp conditions, and calling for vigorous action, has been threatened with disciplinary action for his impudence! Only continuous, tactful propaganda, countered such unsatisfactory attitudes to Army hygiene. In the two years, however, steady but slow progress was achieved in most units, and so reduced their danger to themselves and their neighbours.

Initially each Allied force claimed its own ration scale, incorporating items to its racial taste. With few exceptions, however, the Middle East Field Service Scale was eventually adopted in place of national ration issues. The practice of insisting on central kitchen and messing areas, even in the field, was new to some Allied formations. These too frequently cooked and fed as individuals in their own bivouacs, tents and huts. Insanitary conditions arising from such a practice were deplorable and resulted in it being expressly forbidden.

(2) *African Personnel*.—These are singled out for some comment as their participation, both in modernised war and in the Mediterranean area, was novel. Many health questions arose from this. The emphasis on acclimatization in their case has already been mentioned, as well as the inclusion of bulky cereals in their ration scales. Their inborn physical pride, love of cleanliness and discipline assisted in their rapid acceptance of hygiene practices. Camps occupied by such units as African Pioneer Corps Companies were usually conspicuous by their orderliness and cleanliness. Their mimicry of the European, and not actual necessity, led to their insistent demand for headgear and footwear. The characteristically broad African foot was conveniently accommodated by the broad fittings of the standard British Army boot, so that only a limited demand for special African fittings arose. In winter, special care, as already mentioned, was taken to protect them by securing hut accommodation, extra blankets and such additional items of clothing as pullovers and cap-comforters. No serious incidence of respiratory disease arose. The occurrence of pneumonia in West Africans in Cyrenaica has been discussed in an earlier section. No serious developments occurred as a

result of large bodies of tropical Africans, and therefore including carriers of such conditions as malaria or schistosomiasis, arriving in the Middle East. Some Congo Africans, where initial selection had not been strict enough, showed undue incidence of sick, but on the whole Africans arrived and remained fit. The medical problem giving most concern with all Africans was venereal disease. The African with his undeveloped sense of responsibility and with little inclination to control physical urges is not touched by the usual appeals of education and propaganda made to Europeans. His resultant promiscuity and unconcern in its consequences produced a heavier incidence in gonorrhoea, syphilis and soft sore than in any other group. A comprehensive campaign of discipline, treatment, welfare, and tribal and racial pleas at the most only kept the problem within fair limits.

(3) *Occupied Enemy Territories*.—The medical and health supervision of the three occupied enemy territories, Eritrea, Cyrenaica and Tripolitania was an interesting variation to the usual military routine. To fulfil the Geneva Convention stipulations generously and yet to convert the previous showy, ill-balanced, extravagant Italian medical services into an efficient organization, giving due weight to preventive medical and public health, was not a simple task. Initially, the intolerable insanitation of such key places as Asmara and Massawa in Eritrea, Derna, Benghazi and Barce in Cyrenaica, and Tripoli had to be eliminated so as to make these areas safe for British forces as well as for their own inhabitants. The drive of the British Principal Medical Officers and their local British health inspectors had, within a year, got the gross filth of generations removed, efficient sanitary and water services functioning, and basic hospitals, dispensaries and clinics providing essential medical care for the civil population.

When the medical stores left by the Italians were consumed, Army stocks were drawn upon to supply all essential pharmaceutical and disinfectant items. Hospital equipment was maintained so that the large hospitals in Asmara and Tripoli, for instance, continued to function as fully as ever. In keeping with British practice two main lines of development were followed. First, the improvement of sanitation and health of all urban communities as mentioned above. For this purpose a British health inspector was appointed to supervise each large community, and an Italian and native staff appointed to remove refuse, clean up war-shattered areas, disinfest lousy populations and control malarious areas. Secondly, a system of dispensaries providing simple first aid and preventive care, e.g. for eye conditions, was evolved in each territory. This, for the first time in most cases, gave such modern public health facilities as child, school, and maternal care to the territories. The fortunate freedom of the occupied countries from any large-scale epidemics, mass ill-health or malnutrition is in a large part the outcome of the more efficient and comprehensive medical and health services brought in by the British. This help was given too without any large demand on the British taxpayer. The British staffs consisted of a principal medical officer, less than six assistant medical officers, less than a dozen health inspectors and a small group of stores and office personnel. Each staff controlled a fairly large number of Italian and native medical officers, technicians, and nurses. In Eritrea and Tripolitania medical institutions were only slightly damaged, but in Cyrenaica damage and disappearance of equipment and stores meant a new beginning in every respect.

(4) *Allied Civilian War Organization*.—The Middle East for strategic and economic reasons, as has been seen, became self-contained to a considerable degree. The chief organization in achieving this on the civil side was the Middle East Supply Centre under the jurisdiction of the Minister of State. In its functions of controlling the distribution and import of food and medical supplies it had much in common with the Army. A liaison was therefore provided by officers of the Medical Branch of G.H.Q. serving on the relevant standing committees. The available shipping space and medical supplies were thus allocated between the Army and the various local civilian communities to the best advantage of the war effort. Only some instances from the very large number of important and interesting medical problems dealt with by this organization are possible here.

In 1943, the Governor of Aden reported the occurrence of strange cases of nerve disease apparently associated with flour from Abyssinia. The Army and Air Force immediately

provided experts who traced the mystery to native wheat contaminated with *Lolium temulentum* ("tares"). The necessary preventive measures then became possible. These were—prohibition of Ethiopian wheat until it had been cleaned, and advice to the original producers of the grain in Ethiopia as to how to prevent contamination of their fields with lolium and how to mill wheat from such areas so as to exclude this harmful contaminant.

Another example of work of a medical nature undertaken by M.E.S.C., in which the Army authorities participated, was the occurrence of malaria carried by *Anopheles gambiae* in Upper Egypt. The epidemic which arose was serious both for the civilian and military authorities. To the former the problem meant dealing with vast numbers of sick and dying people, and to the latter there was the threat of interference with war traffic along the Nile and with the local production of food supplies which, in part, were used by the Army. The military medical authorities, therefore, gave strong support to the request made to M.E.S.C. for the urgent supply of such anti-malarial stores as paris green and mepacrine. These stores were accordingly early secured. Similar essential medical stores and disinfectants were supplied, on the concurrence of the military authorities, to such civilian States as Palestine, Syria, Lebanon and Cyprus. Supplies, apparatus and assistance were also provided for the Saudi Arabian Government in handling the annual pilgrimage, via the Red Sea port of Jedda, to Mecca.

A further responsibility of a civilian nature which had to be borne, in its medical planning aspects, practically entirely by the hygiene staff, was that of the preparations made for the re-occupation by the Allies of the Balkans. This was a thorny problem indeed. It suffered from the lack of reliable information of the actual disease incidence, malnutrition, and the availability of medical supplies and stores in the respective countries. The supreme difficulty, though, lay in making staff preparations as the necessary technical personnel, such as medical officers, nurses, etc., were practically unobtainable. However, through the latter part of 1943, planning proceeded designed to give the quantities of essential food supplies, such as pressed meat, dried milk, sugar, pulses, etc., which were needed to deal with any mass deficiency which might be expected, and, in addition, the numbers of those medical and drug units which had been standardized by the Allied Post War Requirements Bureau to cover such things as simple medical treatment, first aid, maternity cases, surgery, etc. Recommendations were also made as to the skeleton advisory and liaison staffs which should be provided for the occupied territories to assist them in the transition from evacuation by the Germans to the time when civilian organizations could assume the responsibility for health and medical care.

This work depended for much of its direction and detail on consultations with a further civilian war organization, namely, the M.E. Relief and Rehabilitation Administration. For some time the medical staff at G.H.Q., M.E., acted as "*ex-officio*" advisers to the Director of this Administration. In such a capacity, military medical authorities became concerned in giving advice and assistance to the large organization which was gradually evolved for handling the various groups of refugees pouring into the area from the Balkans and the Aegean Islands. The military assisted with hygiene personnel, with arrangements for disinfection of refugees, and with medical and health supervision in large refugee camps established in various parts of the Middle East.

(5) *Relations with Middle East Civil Governments.*—Apart from their co-operation in the work of such bodies as the M.E. Supply Centre and the M.E. Relief and Rehabilitation Administration, the Army hygiene authorities had direct concern in the general health conditions of the various civil communities. Each local medical authority was therefore charged with maintaining the closest liaison with civil medical officials, and observing such facts as disease incidence, food and water supply, malaria and typhus control, etc. The need for this interest is obvious, both for protecting the Army and the civil tranquillity on which the ease of military planning and operations depended so much. A civil State disorganized by an epidemic would have been a serious encumbrance to the Middle East Force.

In earlier sections food problems of the various territories were discussed. In their civil aspects military medical opinion was frequently required. The Egyptian cooking oil problem

became acute, and ground nut oil was selected as being a suitable substitute for the Native cottonseed oil. Palestinian citrus, with strong military medical backing, was eventually admitted into Egypt so that the troops could enjoy a higher fruit ration. Sudan meat and Syrian meat and Syrian dates were further local food products in which the Army was interested.

As a further example of joint military and civil interest the huge civilian labour forces employed by the Army may be instanced. From lowly road labourers up to skilled technicians a watch was kept over their health. Civilian practitioners and hospitals assisted the Army in giving medical care, while the Army provided, in many cases, rations, camp accommodation, facilities for bathing, etc. Trained industrial Army medical officers watched carefully over the needs of thousands of civilians working at lathes, work-benches and factory machines in Palestine, Syria and Egypt. Lousiness in all civilian labour was reduced to a minimum and so the threat of typhus removed. Loss of man-hours from accidents and minor illness was under continuous investigation and thus the output of clothing factories, accumulator works, tank and vehicle repair shops was maintained. Such steady health and welfare work was an important field of military and civil co-operation, but a more spectacular one was dealing with communicable disease. Though friction might easily have developed here, with civilian States anxious lest the military traffic introduce and spread disease, and the Army nervous of its man power and labour forces being crippled by endemic disease, there was a general happy co-operation throughout the year. Yellow fever was the threat from outside most feared by local civilian governments, especially that of Egypt. The Middle East Force did everything in its power to conform to the various precautionary measures such as the vaccination of personnel travelling through the endemic African areas, and the disinsectization of aircraft and shipping arriving in Egypt from infected areas. Smallpox cases arrived in shipping, on occasions, but vigorous vaccination and isolation of sick controlled the disease.

As far as endemic Middle East conditions were met the three provoking crises for both military and civil interests were plague, typhus and malaria spread by *A. gambiæ*. Plague at various times appeared in Haifa and Jaffa in Palestine and in the Canal ports of Egypt. Some of the outbreaks in the latter areas reached serious proportions. The Army assisted the civilian efforts energetically by protecting its own personnel in the areas by anti-rodent measures and by vaccination. Typhus was a serious source of anxiety in the winters of both 1941-42 and 1942-43. In the latter season a major epidemic raged, especially in Egypt, though fortunately the mortality rate was not typical. A fair number of cases occurred in the civilian labour force of the Army. Military cases were isolated and scattered, though with some concentration in the urban areas. The usual high mortality in individuals over thirty was again noted. The winter of 1943-44 was fortunately fairly free of typhus.

The problem of the spread of *A. gambiæ*, the dangerous vector of malaria, from its more usual haunts in the southern section of the Nile, northwards, was serious in both its regional and international aspects. It threatened the densely populated Nile Delta with a most serious form of malaria, which in turn would have become a potential source for its conveyance further afield into Asia, especially India. First noted in the present cycle in Southern Egypt in 1941 *gambiæ*-borne malaria caused such severe illness and mortality in many districts as far north as Assiut, i.e. only two hundred and thirty miles from Cairo, as to affect food production in these regions. Here it is only necessary to state that the military services placed every facility at the disposal of the National administration, e.g. technical personnel to carry out entomological surveys and to assist in mosquito destruction, supplies of paris green, malariol, mepacrine, etc. No further spread in the years in question occurred but the problem still exists and the Egyptian Government is now examining the possibility of a large-scale eradication campaign.

#### I. INCIDENCE OF DISEASE AND INJURY.

(1) *General Remarks.*—How is the health of an Army to be estimated? Unfortunately, there is still no direct means of assessment which can allot exactly to health measures the positive influence they exert, say on an El Alamein victory, or in maintaining the confidence

of an Eighth Army after a retreat from Gazala. There is ordinary clinical opinion which confirmed that the average soldier in the M.E. looked at the optimum of his physical powers in his possession of a healthy skin, a clear eye, a brisk movement and a generally contented mind. There is the proof of achievement, for the forces of the Middle East were not overwhelmed by reverse, maintained morale for years, and then rose to the ultimate for a successful army in obliterating their opponents. Only a fit and healthy army could have accomplished these things against a strong enemy.

Though the positive instrument for accurate measurement of the health efficiency of an army is lacking, the negative index lies in the incidence of disease. Disease incidence is both a criterion of wastage of man power as a whole and, in the case of certain specific conditions, also of the degree of failure of preventive medicine. This index for the Middle East Force in 1942 and 1943 was based on hospital admissions which are given as ratios in the following table :—

ADMISSIONS TO HOSPITAL IN VARIOUS CAMPAIGNS.

<i>Campaign</i>	<i>Battle casualties ratio per 1,000 strength</i>	<i>Non-battle casualties ratio per 1,000 strength</i>	<i>Total ratio per 1,000 strength</i>
Middle East, 1942.. ..	31.1	553.6	584.7
Middle East, 1943 .. ..	22.5	490.5	513.0
France and Flanders, 1914-18 ..	364.3	646.6	1,010.9
Macedonia, 1915-18 .. ..	43.1	1,195.1	1,238.2
Egypt and Palestine, 1915-18 ..	59.0	741.0	800.0
Mesopotamia, 1914-18 .. ..	89.0	1,164.0	1,253.0
South Africa, 1899-1902 .. ..	38.0	728.0	766.0
East Africa, 1914-18 .. ..	32.0	2,244.0	2,276.0

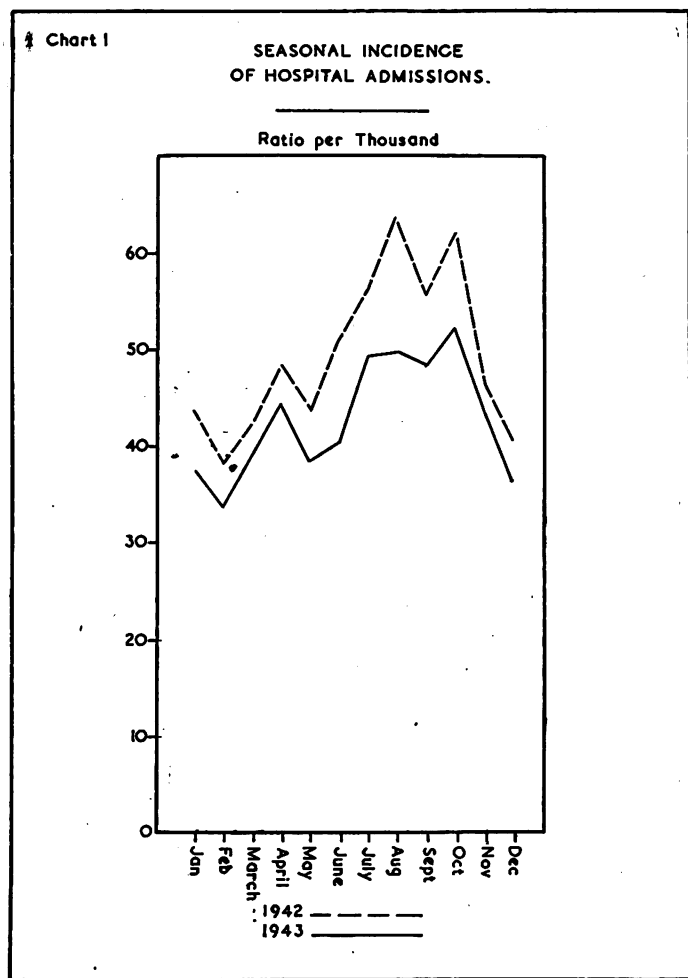
These Middle East rates of hospital admissions are excellent, bettering the records of the last war, though it is admitted that direct comparisons cannot be made. This table also shows that the present campaign follows the general rule that disease is more damaging to the human strength of an army than enemy weapons. This was even true of the Middle East Force during its hectic periods of activity in 1942.

The detailed study of the hospital statistics of the Middle East Force deserves a report to itself. Here only a few salient features can be described. An interesting chart is that of the seasonal ratios of hospital admissions shown in Chart I. This gives striking visual confirmation of the importance of the summer conditions in causing hospital admissions. These were the excremental diseases, malaria, many skin conditions, sandfly fever and infective hepatitis.

Chart 2 lists the principal causes of admission in per cent of total admissions and as a ratio per thousand strength. The parallelism between the two years is clear, the only major exception being the change-over to Skin Condition and "Other Diseases of the Digestive System" as the most important cause of admissions. The second important fact made clear by the Chart is that the first six most important causes of hospital admissions are largely preventable—skin diseases, digestive conditions, accidental injuries, dysentery, malaria and venereal diseases. Even in 1942, the year of maximum operations, "Injuries in Action" occupied only seventh place. The chart is then a decided confirmation of the importance of preventable disease in the causation of human wastage in a theatre such as the Middle East.

(2) *Some Specific Conditions.*—The following conditions warrant some remarks :—

(a) *Excremental Diseases.*—Though there is a largely common epidemiological background to dysentery, enteritis and gastro-enteritis, yet their bacteriological and clinical differences make classification difficult. It has not therefore been possible to give the exact incidence of this group, but if to dysentery is added a proportion of the group included under "Other Diseases of the Digestive System" to cover cases of enteritis, etc., then there is no doubt of the predominant position of excremental disease in the Middle East disease record. The efforts to control them are all mentioned in various sections of this report—education in personal and camp cleanliness, control of flies, food, food-handlers, water supplies, and sanitary services. This many-sided attack was fairly successful, but it is a campaign which is endless.

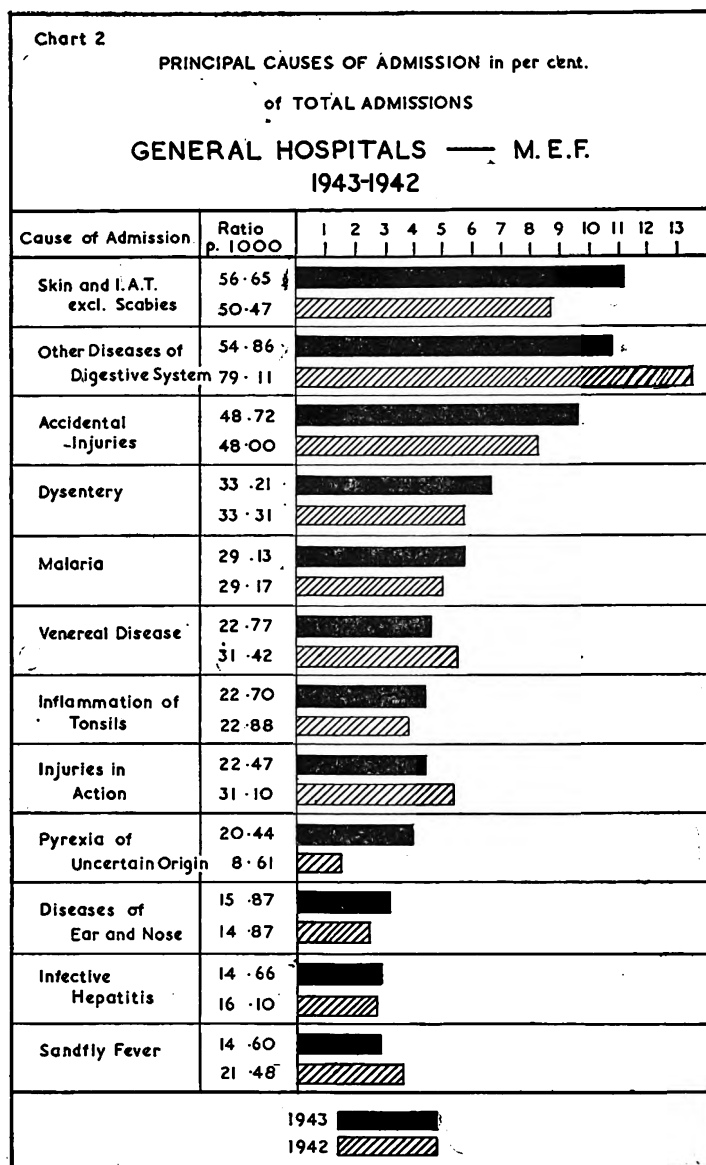


Depending so much upon the individual and unit sense of responsibility, it is difficult to maintain efficient control. Much thought had, therefore, to go into devising new propaganda methods to attract fresh enthusiasm each year for such unspectacular work as clearing up refuse, protecting cookhouses, maintaining latrines in good order, etc. Then, obviously, much more education is required before every individual is fastidious about the origin and protection of his food, and the automatic cleansing of his hands before eating, etc.

(b) *Skin Conditions*.—The dramatic influences of war—weapons, malaria, typhus, dysentery, venereal diseases—have clouded appreciation, and have even led to neglect of more common and, under many circumstances, more important causes of man power wastage. Two of these ordinary very serious causes in the Middle East were skin conditions and accidents. Skin and Areolar Tissue conditions resulted in hospital admissions to the extent of 56·65 per thousand strength in 1943 and 50·47 in 1942.

Under the heading of "Diseases of the Skin and Areolar Tissue" are included such items as boils, abscesses, epidermophytosis, "desert sores," impetigo, septic dermatitis, etc. The lack of interest of the Medical Services was reflected in the vague diagnoses and uncertain treatments common in this group of diseases. Investigation and its consequential suggestions for control were thus hampered. A steady insistence in orders, hygiene and medical memoranda and in propaganda was part of the programme to reduce skin conditions, while on





hygiene recommendations the Army administration set about providing ablution facilities, supplies of foot powder, and arranging for regular foot and skin inspections. Especial attention was paid to desert sores and epidermophytosis. A general note on the former will be found in a previous article (Gear, 1943). Tinea pedis was extremely common and, as usual, was most troublesome in summer. The following general preventive measures were instituted: regular foot inspections, regular use of Army foot powder, disinfecting vats of 1 per cent sodium hypochlorite solution in ablution rooms and bathing pools, regular washing of changing-room floors, etc., with cresol, prohibition of sharing of towels, etc.

(c) *Accidental Injuries.*—The lack of interest hitherto in accidents is regrettable, as they are a most serious detrimental influence on both the human and material resources of any army. Vehicles and other equipment are damaged and destroyed and human lives are cut short or their usefulness decreased. In both 1942 and 1943 accidental injuries led to 48 men

per 1,000 of the Middle East Force being admitted to hospital. The record of deaths in hospital, which of course does not include deaths of individuals dying outside medical units, confirms the seriousness of accidents, for in 1942 and 1943 they were responsible for 31 and 30 per cent respectively of all hospital deaths. Even in such an active operational year in the Middle East as 1942 accidental injuries led to more *hospital* deaths than battle casualties.

As accidents caused such a large number of deaths it is not surprising that the proportion of serious injury was also high. This is borne out by the fact that orthopaedic centres in the period July 1, 1942, to June 30, 1943, handled only just over 3,000 cases due to battle casualties and yet nearly 6,000 cases of major bone and joint injuries due to accidents. This is a further disturbing index of the part played by accidents in causing serious damage to human material in an army. Major bone and joint injuries require considerable and specialized (and hence expensive) surgical care and time to treat. A large number of such patients also suffer a permanent loss of efficiency. All these conditions are theoretically preventable, and by bringing these extremely important facts to the notice of the administrative authorities, a stimulus was provided for a general campaign to reduce road accidents, accidental fires, industrial mishaps, etc. However, the problem is an extremely complex one branching out into all Army activity and but slow progress is achieved. As with so many problems of any public health administration, educating the individual to an awareness of the importance of his part is fundamental to improvement.

(d) *Malaria*.—A curious coincidence is that in both 1942 and 1943 the annual ratio per 1,000 strength of hospital admissions due to malaria was 29. Such a ratio is admittedly not alarming by comparison with calamities due to malaria in such campaigns as that of Salonika of the last war. Nevertheless, when it is borne in mind that on the whole the Middle East is only mildly malarious, a ratio of 29 is not completely satisfactory. Broadly speaking the whole of the Middle East, excluding the true deserts, is malarious. Within this general malarious region certain areas are particularly dangerous such as the Jordan valley and certain places along the Palestine and Lebanon coastal plains. The primary function undertaken by the Army malarial organization was therefore to determine accurately the geographical variation of the malarial hazard. Initially three, but latterly two, Malaria Field Laboratories were available for this work. Within a few months the main malaria surveys were completed. For such areas as a large part of the Lebanon and Syria these were pioneer studies. The malaria season was taken as covering the period from the beginning of April to approximately the middle of November, except in the Sudan and Eritrea where it continues throughout the year. The common vectors were: *Anopheles pharoensis* in Egypt, *A. gambiae* in Upper Egypt, the Sudan and Eritrea, *A. superpictus* and *sacharovi* (*elutus*) in Palestine, the Lebanon, Syria and Cyprus. *A. claviger* is common in Palestine and the Levant and was a frequent cause of sharp, local outbreaks sometimes mysterious in origin. Other vectors of not such general importance are *A. sergenti*, *A. multicolor*.

It is not possible to describe the comprehensive anti-malaria control organization in detail. It was designed to maintain constant observation on the ecology of the various Anopheline vectors, develop new methods of control, undertake general anti-larval measures through special malaria control units, and train and supervise units and camp staffs in anti-larval, anti-adult and personal protection measures. Advisers at each command headquarters, local hygiene officers and sections, two malaria field laboratories and nearly thirty special malaria control units, employing large gangs of labourers, composed the special Middle East control organization.

The lessons learnt were not really new. The chief one was that the work of special units in dealing with mosquito breeding and adult destruction, though frequently adequate in permanent camps, simply must be supported by unit and personal effort in the field if malaria incidence is to be reduced to manageable proportions. Usually it is only a forceful example of an outbreak which drives this need home. Medical insistence that as no simple drug, device or measure is a safeguard, *all* measures, including siting of camps, oiling or "paris greening" of breeding places, spraying insecticides into sleeping and living quarters, wearing

clothing (long sleeves and slacks) to cover arms and legs, supplying insect repellent to exposed skin areas, sleeping under netting, and when necessary taking mepacrine as a suppressant, must be used, was only gradually accepted. As with so many preventive medical measures dependent upon the individual, malaria control is much simpler to plan than to execute. Only vigorous education, training and discipline secure success. This was exemplified several times. A battalion on dispersed guard duty along a Syrian border, in spite of over a year's experience in the Middle East, neglected such precautions as checking that all men were wearing slacks, applying mosquito cream, and using sleeping nets, with the result that scores of cases occurred in a few weeks. Rigid application of these protective measures, with mepacrine suppression, abruptly ended the outbreak. In Syria, a brigade moved into a semi-permanent camp, and, discipline again being lax in supervising the adequacy of both local mosquito control and personal precautions, suffered serious sickness. These local instances, complementary to the losses due to malaria in the Sicilian campaign, converted completely the Army administrative authorities to the importance of malaria prevention. It is almost a psychological law that no amount of propaganda, exhortation or training will, in the actual absence of the hazard, make an army malaria-conscious. Actual experience and direct knowledge were the most potent influences in the Middle East in such conversion.

(e) *Venereal Disease*.—Hospital admissions due to venereal diseases were 31·4 per 1,000 in 1942 and 22·8 per 1,000 in 1943. The proportion of types was approximately, syphilis 8 per cent, gonorrhœa 28 per cent, venereal sore 32 per cent, other forms 32 per cent. The significant figure here is the high proportion of venereal sore. The venereal disease problem had been anticipated with some anxiety. A large heterogeneous mass of soldiers in wartime, in the circumstances to be found in the Middle East, seemed destined for much venereal infection. The usual preventive and treatment measures which were taken to meet this eventuality do not need special description. There were education and propaganda mainly through unit medical officers, provision of personal prophylaxis and unit early treatment centres—in the case of large urban areas centrally situated prophylactic ablutionary centres—special hospital treatment, and finally a vigorous and comprehensive programme of sports, recreation and welfare.

However, a short reference to the special problem of brothels is justified. In practically all urban areas in the Middle East brothels were flourishing and were the preponderating potential source of infection. A strong medical demand for placing such premises in the Middle East out of bounds to troops was based on the following arguments:—

(i) They were far and away the most likely source of venereal diseases both from their nature and their easy accessibility. No such volume of contacts as occurred in brothels could be visualized as being possible through street or secret prostitution.

(ii) Such premises were almost invariably insanitary themselves and situated in most insanitary, sordid and degrading environments. Venereal diseases thus were but one of several health hazards to be met with in brothels. Typhus and scabies were distinct examples of infections, and doubtful drink and food were only too frequently consumed by patrons. Correctly, too, the medical authorities pointed out the influence of such conditions on morale, though perhaps such other factors as prestige and political repercussions of a policy of toleration of brothels lay outside medical judgment.

After some considerable discussion, where fears of the proposed policy were raised, brothels were placed out of bounds during 1942. The results have been watched closely. None of the expressed fears, such as intolerable conditions of street prostitution, or an increase in crimes of violence, or a deterioration in discipline, etc., have been confirmed. Generally the behaviour of troops has improved materially during the period since brothels were placed out of bounds, while venereal disease incidence significantly declined. Thus the early anxiety of venereal diseases becoming a burdensome problem has fortunately not been justified. This is a result due to the same general form of attack, employing all possible preventive, curative and associated welfare and disciplinary measures, as is required in dealing with so many problems of either military or civilian public health.

(f) *Industrial Hazards*.—The elaboration of the Middle East into a vast war workshop made industrial medicine no mean function of the Army Medical Services. It is probably difficult for those who have not toured the Middle East in wartime to visualize the variety and size of the industrial hazards of such military installations as tank and vehicle repair depots, mine-filling factories, car battery and accumulator works, petrol tin factories, food factories, etc. The protection of the working population in these installations so as to maintain and even to boost production was, throughout, an urgent duty. Special industrial medical officers were appointed to each area, and in each factory and depot were placed first-aid orderlies or nurses. These latter were usually locally employed civilians. Industrial plant was designed or modified to eliminate noxious fumes or dust. Working hours were watched so that the maximum compatible with optimum production was not exceeded. Refreshments on site and full facilities for ablution, etc., were arranged.

Two particular industrial hazards will give some conception of the type of problem met by the military hygiene authorities. First, there were the hygiene aspects of the enormous programme hurriedly launched to meet the need for millions of mines for the defensive line at El Alamein in July and August, 1942. Several T.N.T. mine filling factories were built. The following medical recommendations were adopted for their design and operation. The factories were designed to reduce dust and fumes to the minimum; inhalation of, and skin contact with, T.N.T. being the particular hazard in these plants. Parallel with this went full ventilation arrangements, including exhaust hoods at points of production of fumes or dust. Floors and tables were oiled and the whole premises frequently cleaned. All employees were selected, eliminating those with histories of jaundice, gall-stones, gastric, kidney or liver disease, and those reacting to a test for idiosyncrasy to dinitrochlorobenzene. Regular use of showers and hand basins was obligatory, while milk, for its general nutritive properties, was issued daily. These measures were entirely successful in protecting T.N.T. workers from poisoning.

The second interesting problem arose with the introduction of high octane petrol for all purposes in 1943. In the Middle East this meant definite risks of lead in the petrol filling factories. Several acute and chronic cases occurring in some civilian installations in Egypt served as an additional warning of the need for preventive measures. These were promptly introduced into military plants and were as follows: (i) The filling apparatus was modified so that petrol was discharged into tins without spillage; (ii) filling sheds were open as much as possible, in most cases being merely a roof structure; (iii) overalls for use by filling personnel; (iv) showers with hot water for use of personnel coming off shift; (v) rotation of work to allow personnel two weeks in three in a lead-free atmosphere.

(g) *Other Conditions*.—The scope of this paper allows only passing reference to many diseases and conditions which presented preventive problems during the various campaigns. Typhus was throughout each winter a challenge to the Force more through its potential disorganizing of civil government and services than as a direct threat. The main features of the measures against it have been sketched above. Infective hepatitis struck one serious blow in the latter stages of the advance from El Alamein when hundreds of cases occurred in New Zealand, Australian and United Kingdom Divisions. Intensive research had not elucidated its epidemiological puzzles by the end of 1943. In 1942 its incidence was 16 per 1,000 strength and in 1943, 14.6 per 1,000 strength. The menace of sandfly in crippling large numbers of new arrivals in August and September has been indicated. Scabies was a nuisance only in Malta, where frequent direct contact of Maltese troops with their families produced many reinfections. Diphtheria was prevalent in only a few units, but at no time was sufficiently serious to call for universal immunization of the Force. Schistosomiasis, in spite of Egypt being one of the notorious endemic foci, claimed only isolated cases, a result to be ascribed to the placing of few troops in the irrigated areas and to the general knowledge of the origin of this disease in canals and streams. Tuberculosis as residence in the Middle East lengthened became more obvious. Typically it took the progressive infantile form in rural Africans, in whom it had most serious prevalence. With those few references this section

must close, but in a future publication an attempt will be made to give fuller statistical facts of disease incidence during these years.

#### J. SUMMARY.

The diversity and size of the Middle East in its geographical, racial, and political features added to the extreme complexity of health problems in the mixed heterogeneous formations composing the Middle East Force. These difficulties were intensified by the years 1942 and 1943 finding the United Nations on the defensive resulting therefore in restricted supplies. The care of the Force was undertaken on orthodox lines with medical and hygiene administrative officers and units in each command and formation. The weakness of this orthodoxy lies in the tendency of the Army (and civil national services, too, it may be said) to concentrate on the executive care of medical units and casualties and to neglect to some extent less spectacular preventive and public health needs.

In the purely health sphere, accepting the fundamental principle that the individual soldier and unit must be self-reliant, considerable emphasis was given to health education and propaganda, using all the usual media of schools, lectures, demonstrations, leaflets, posters and films. The hazards of heat, light and local infections were met by such measures as a period of acclimatization for new troops, suitable clothing and equipment, and by the usual careful attention to pure water and food. Adequate balanced ration scales were not always easy to compose owing to shipping lack reducing imports of certain types of food. Local supplies were then exploited. Repeatedly, Middle East experience has shown the importance of protecting food from depot to the soldier's mouth to ensure its purity and its adequacy. The Army cook has at last come into his own. No food-deficiency disease occurred. The menace of the fly, the mosquito and the sandfly was met by camp siting, control of breeding places and intensive training of all troops in personal protection. Camp cleanliness was shown to pay. Special measures were needed to meet the quite phenomenal fly plague after the retreat from Gazala to El Alamein.

Sanitation and preventive medicine were novel ideas to most Allied formations in the Middle East Force. Conversion of these groups was slow, though the Poles eventually were most praiseworthy practitioners of military hygiene. Especial care had to be given to the African, a newcomer to conditions of modern warfare and largely rural tropical in origin, therefore susceptible to crowd diseases. Captured enemy territories of Eritrea, Cyrenaica and Tripolitania were quickly cleared of long-standing insanitation and given better-balanced medical and health services for their native populations.

The Middle East hygiene authorities were also involved in various advisory and co-operational capacities with Middle East States in civilian problems of food supplies, epidemic diseases and medical stores. Typhus, plague, smallpox in several States, and malaria in Upper Egypt carried by *A. gambiae*, were acute civil problems affecting the Army. The success of the principles and application of military hygiene in the Middle East campaigns of 1942 and 1943 is partially measured by the low incidence of hospital admissions which were for the two years 553·6 and 490·5 per thousand strength. These rates are a distinct improvement on those of any previous wars. However, it is rather in the positive picture of health and vigour shown by the soldiers and their successful achievements in adversity and final victory that hygiene sees that it did not fail to play its part.

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#### REFERENCE.

GEAR, H. S. (1944). *Brit. Med. J.*, **1**, 383.

## MALARIA IN NORTH AFRICA, 1944.

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## INTRODUCTION.

THE History of Malaria in Algeria is written, by Sergeant, in "*Vingt Cinq Années d'Etude et de Prophylaxie Du Paludisme en Algerie*" (Institut Pasteur). Long before the British Army set foot in North Africa the fundamental principles of malaria prevention were recorded here and elsewhere. That this book should have been written in the same country as the malaria ridden plain of Bone, with its man-made borrow pits and uncontrolled irrigation systems, is a strange anomaly. Stranger still is it that in 1943 the British Army should have suffered so much malaria in the country where, eleven years previously, the same author wrote "*L'Armée d'Orient délivrée du Paludisme*," describing a similar disaster in the French Army. Malaria prevention is not a medical problem; in peace, it is a matter of local administration; in war, discipline.

It was evident from the serious malaria casualties among British troops in North Africa, 1943, that a vigorous campaign of malaria control would have to be enforced in 1944 throughout those areas still occupied. In particular, Bone, where in 1943 there were over 5,000 fresh cases among British troops, required special attention. At Algiers there was less danger of malaria, but a larger population at risk.

Isolated units were a special problem; in Philippeville and Constantine areas, troops were exposed to malaria with too few personnel to carry out effective anti-mosquito measures—particularly was this so at Le Khroubs (Constantine). Permanent camps which had been badly sited in 1943 could not be moved, and often control measures covered large areas for the protection of relatively few men. Nevertheless, where possible, troops left behind were centralized into the larger towns.

The spring of 1944 had a very heavy rainfall up to the end of April—"printemps pluvieux été fievreux"—but low temperatures, persisting into May, delayed the onset of Anopheline breeding; adult counts in Bone did not rise before May 20, 1944, and breeding generally was four weeks later than in 1943.

The malaria campaign of 1944, particularly in Bone, owed much to the solid foundation of work carried out in 1943. We reaped the results of two years' work.

## I.—ORGANIZATION.

(1) *Personnel.*

*Algiers.*—The district was subdivided between 132 (U.S.) M.C.U. and 30 (Br.) M.C.U. In addition "K" M.C.U. helped for four months. All malaria work was co-ordinated by the Commander, Algiers Sub-district, at the fortnightly meetings of the Sub-district Hygiene Committee. Work undertaken by the French Civil and Military authorities did not affect British or American sites.

*Bone.*—34 (Br.) M.C.U. and 51 (Br.) M.C.U. shared the area of responsibility with "F" M.C.U. which arrived in April. In addition 14 Field Sanitary Section worked continuously on adult control. Co-ordination of the work was carried out by the O.C., 14 Field Sanitary Section, the

D.A.D.H., Bone Sub-district, and the Malariologist, North Africa District, who also checked the work in the field. Work undertaken by the French Services was confined to the town itself and no reliance was placed on civil work where British personnel were concerned.

Apart from the two main areas, 45 (Br.) M.C.U. worked at Djidjelli until the end of June, and "G" M.C.U. for two months at Le Khroubs and Ain Smara (Constantine). Work at Philippeville was directed by 14 Field Sanitary Section.

The work of 51 (Br.) M.C.U. and 30 (Br.) M.C.U. has been excellent. In selecting men for malaria control units, it seems to be overlooked that there is no establishment for a Corporal—and any Corporal who is interviewed must be selected with due regard to his capabilities as a potential Sergeant.

## (2) Training.

Early in 1944, Medical Officers, Hygiene Officers, M.C.U. Officers and N.C.O.s were being trained at the A.F.H.Q. Malaria School. As a result of this trained nucleus, local courses were held both in Algiers and Bone for the training of medical officers, but more particularly of officers, N.C.O.s and O.R.s of unit squads. To these squads, one day's training with practical demonstrations was usually given; and, later, visits by M.C.U. Officers to help and check their work. At Bone two special half-day courses in adult destruction were given; and by the aid of interpreters, Swazi Pioneer Corps squads were also trained.

## (3) Labour.

Both Italian P.O.W. and Arab labour were used. Opinions on their relative value differ, but probably the best work is done by a hand-picked Arab squad with a European Chef. Numbers employed daily varied seasonally as follows:—

Algiers. January, 40; May, 460; August, 140.

Bone. April, 800; August, 300.

Labour was also employed at Philippeville, Ain Smara, Oued Athmenia, and Le Khroubs.

## (4) Equipment.

The equipment in use was generally satisfactory (though earlier in the season the diaphragm of one type of sprayer was a constant source of trouble).

Mechanical Equipment: The quantity available in 1944 was small, but particularly at Bone was used with good effect; the Fire Pump proved the most useful single adjunct of this type, but aeroplane, bull-dozer, dragline, amphibious jeep rafts and mechanical sprayer have all been in use.

Considerable trouble was experienced in Bone with poor quality paris green. It was noticeable that the M.C.U.s working here show a preference for malariol, and oil was, in fact, used almost exclusively.

Their faith in paris green was partly shaken by its ineffectiveness (due to physical deterioration) and partly because its application requires greater skill. Teaching and practice in paris green work are specially required in revision or other training courses this winter for M.C.U. officers and men.

At Bone, only specially trained units were permitted to draw supplies of paris green, and the wastage of a general *per capita* issue was avoided. D.D.T. was used on a small scale at Algiers by 132 (U.S.) M.C.U., *but nowhere else*.

## (5) Transport.

Shortage of transport or the breakdown of existing vehicles was a constant problem: it was overcome by various means, but M.C.U. officers wasted much time over M.T. difficulties. The jeep proved itself the best mounting for the sprayer insecticide, engine driven; it is both small enough to enter stables, and mobile in rough country; thus the amount of man-handling is reduced, with economy in personnel. When a jeep is not available the pump can be mounted on a wheelbarrow and conveyed on a truck. The engine is kept level by a new floor in the barrow, and continues to run when being wheeled, an extra pair of folding legs also keeps the engine horizontal when at rest. However this method is more laborious and requires more men to operate the sprayer than when mounted on a jeep.

## II.—MALARIA CAMPAIGN.

Algiers started early. This was the key to their success. By the beginning of March all the heavy clearance of rivers and streams had been either completed or was well advanced; work had been continued, in fact, all winter, and the larvicide programme was greatly facilitated. The Bone campaign started slowly, and much of the preliminary clearing was not finished before chemical treatment became necessary. However, the low prevailing temperature in April delayed the start of breeding, and enabled the programme of larval control to be well established before larvæ appeared. This respite offset the late start.

At Bone all hygiene and M.C.U. officers and N.C.O.s made a thorough Anopheline survey of the whole area in the first week of June. The information derived, concerning the distribution of breeding and the Anopheline density, was discussed, and proved a most useful check on the work already completed. As a result of this the whole plan of adult catching stations in the district was revised.

Work proceeded throughout the summer. Anti-larval work ceased on November 1; anti-adult work continues throughout the winter.

## SUMMARY OF MAJOR WORK COMPLETED.

(a) The major anti-larval work completed in the main areas was as follows :—

	<i>Borrow pits</i>	<i>Rivers and streams</i>	<i>Ditches drains</i>	<i>Swamp</i>	<i>Wells</i>
Bone .. .. .	6	50 miles	46 miles	90 acres	100
Algiers .. .. .	12	48 "	58 "	20 "	—
Philippeville .. .. .	4	4 "	5 "	30 "	—
Ain Smara, Oued Athmenia	—	5 "	5 "	—	—
Le Khroubs .. .. .	—	2 "	10 "	—	—

(b) The anti-adult work carried out at Bone was as follows :—5 Arab/French villages were sprayed regularly once or twice a week. In addition the motor driven pressure pump, mounted on a jeep, visited 29 farms (60 stables, cowsheds, etc.), and 4 Mechtas with a total of 130 Gourbis in its twice weekly programme.

## A.—Typical Problems in Larval Control.

(1) *Work of M.C.U.s.*

*Borrow Pits.*—(a) St. Augustin's Ponds. The largest borrow pit bred extensively in 1943. In 1944 complete control was achieved by banking and oiling, with weed removal by drags, rafts and amphibious jeep. No larvæ were found, and only occasional anophelines in the local catching stations. The pond was finally dried in July by pumping 5 million gallons.

The basic principles of banking, weed removal and larvicides were widely applied to similar problems such as the Sba reservoir, the water point and the brickworks (Philippeville).

(b) Baraki (Algiers). In 1943 control was attempted with paris green, but was difficult owing to heavy emergent vegetation. In 1944, in March, with the co-operation of a nearby American signal unit, broken power lines were restored and the electric pump on the pit repaired. Constant pumping day and night for two weeks was necessary to empty it.

Although pumping will control for a season, filling (by bulldozer or tipper) is the perfect answer. At Bone one series of pits was filled by tipping town refuse, and three other pits were bulldozed. This was the continuation of work commenced in 1943.

*Rivers and Streams.*—In 1944 perfect canalization was not attempted. Experience in 1943 had taught that against *A. maculipennis labranchiae* canalization alone is not enough; therefore clearance, path construction, and correction, were done purely to facilitate chemical control. This involved heavy work in several places untouched in 1943, e.g. Oued Maelma (Algiers), Oued Sba.

(a) Oued Lagha (Algiers): Control failed in 1943 due to failure to deal with the cane growth; quite heavy breeding was found late in the season. In January, 1944, the cane growth was cleared. In February two towpaths were dug along each bank, cane roots were



dug out and burnt (the roots are too often left). The paths were further improved in March and oiling commenced in April. Floating weed mats were killed by the larvicide and periodically removed. No breeding reported this season. A unit is sited within a few hundred yards of this river but no malaria has occurred.

(b) Oued Seybouse: In 1943 the Seybouse fortunately did not breed, but this year *A. maculipennis* and *hispaniola* found the shallow seepages suitable, and lodged among the bare stones. Simple channelling reduced the affected areas, and brush oiling was found the best method of larviciding. One stagnant backwater was obliterated by bulldozer. The success of these measures was shown by the low adult anopheline counts maintained at local farms.

Another interesting method of control was tried on the Oued Maelma (Algiers). In April, tributaries and the main channel were well canalized and then covered over with cane and herbage, care being taken that the flow of water was not interrupted. This coverage resulted in a total lack of weed growth and the stream was quite unsuitable for anopheles. It was a satisfactory method of control and required only occasional maintenance where the work was disturbed by cattle.

At Algiers some experiments were tried out with flushing. A wooden dam was evolved which could be carried to the required place and built into the river bed. It was not, however, used during the malaria season owing to the system of water rationing for irrigation purposes.

The Oued Bou Djemaa remained weed free where it was draglined by the French in 1943. But its exposure to sunlight encouraged the growth of *Algæ*.

*Swamps.*—(a) The aerodrome swamp was one of the earliest and heaviest sources of anophelines. It was not controlled in 1943 until August. This year, while still extensive, it was sprayed with paris green from the air, and later from the ground. To improve access to aerial spray, extensive reed cutting was necessary. The cause of the swamp is tidal silting with sand at the mouth of the Oued Krelidj, while much of the Bone Plain here lies below sea level. Ten men were therefore employed on maintenance of the channel which, initially, was dynamited—and this measure, together with drainage channels, effectively dried the body of the swamp at least three weeks earlier than last year, in spite of the heavier and later rainfall. Larval control, while never complete, lowered the anopheline density sufficiently for adult control to complete the work.

At Rhégaia (Algiers) also aeroplane spraying of paris green was carried out, but both here and at Bone the indifferent kills must be attributed to several factors: (i) The paris green was later found to be below the requisite standard; (ii) the Lysander is not the most suitable plane; (iii) spraying by plane is a job which requires not only a skilled pilot but a pilot skilled and experienced in this particular work. He should know exactly what he is doing and have been trained by following up his work on foot to note larval kills. The pilots who came to Bone had little or no experience.

(b) Oued Meboudjah. A swamp due to age-long silting of the Oued Meboudjah tributary was drained dry by a drag-line channel. The water in the upper reaches of the river was helped over the sill of a road bridge by pumping. The Indian Swamp was similarly tackled, but here there was no outlet for the water. The swamp was filled in with excavated soil and the channel acted as a clean and easily controlled lagoon.

*Irrigation Systems.*—The biggest stumbling-block to control is the financial interests involved. Only at Oued Athmenia (Constantine) can willing French co-operation be recorded—and this was due to the evident benefits of malaria work in 1943, when co-operation had not been so free. Le Khroubs (Constantine) with its three complicated systems covering 20 square kilometres was thoroughly surveyed for the first time, and a system of control by sluices supervised by "G" M.C.U. The results were not good through lack of civil co-operation and indifferent work by "G" M.C.U.

## (2) *The Work of Unit Squads.*

The personnel are so mixed in capabilities, and C.O.s so variable in their interest, that it is impossible to lay down any ideal method of using the unit squads in an integrated sub-district campaign. They have been used for the supervision of labour, for the maintenance

of work originally carried out by the M.C.U.s, for chemical work, adult spraying, and smaller control measures, ditches and wells ; but the unit squad capable of doing a complete job of malaria control in their own area is the exception.

The three following examples are from the Bone area :—

(i) The valley of the Oued Deb was controlled by the Yugo-Slav Pioneer Company. Though many cases of malaria came from here last season, not a single anopheles has been found there this year, and no fresh case of malaria from the company.

(ii) A fresh water lagoon among the sandhills was brought under control in July of last year by salinification. In 1944 control was exercised by 212 P.W. Camp. The unit squad, using a continuous pump, and a pump of their own construction, filled in the sides of the lagoon, by tipping soil carried in wheelbarrows and petrol tins, as the water level fell : they reduced this lagoon with subsidiary swamps from 12 acres to a single yard wide ditch taking the camp sullage water. No anopheline breeding occurred, and negligible cases of malaria. The main borrow pits having been bulldozed in 1943, this work was sufficient to control the Eastern end of the ill-reputed transit area. The lagoon is now greatly diminished in size and could be filled in with sand.

(iii) 97 (Br.) General Hospital site was inundated with *A. maculipennis* in June—a severe break-through giving rise to as many as 20 anopheles in a 160 pound tent in the morning. The unit squad carried out the necessary control work and eliminated anophelines from the area with such effect that counts from the 6 unit catching stations dropped from a total count of 126 anopheles (a quarter catch in each station) on June 5, to 1 anopheles and 7 culex on August 19. Two fresh cases of malaria from the staff have been notified and none from patients.

The work of these three units has been outstanding.

**Salinity.**—Major Beadle, R.A.M.C., was the first to point out (1943) the practical implications of salinity at Bone. *A. maculipennis labranchiae* will not breed in water of over 50 per cent sea water. The Oued Bou Djemaa reached a concentration of 50 per cent sea water at the beginning of August, 1943. In 1944, thanks to the drag-line operation carried out by the French, this salinity reached the bridge on July 7, 1944—and would doubtless have done so earlier, but for the heavy spring rainfall. In the aerodrome area the salt was, this year, of less consequence, as with the maintenance of the channel through the sandhills, the whole dried out very much quicker.

#### B.—Adult control.

At Bone, the anopheline density in each area was followed throughout the season by bi-weekly counts at selected catching stations.

Each area of control had these counts plotted on a wall map. They were found a most sensitive index of the effect of control measures, and a valuable contribution to adult destruction. Unit squads received special training in anti-adult measures, and this work they did well. Many units kept records in their own catching stations and sent them in weekly to the D.A.D.H. (this was laid down by the S.D.R.O. at Bone).

The Mechta village near R.A.F. Headquarters is, with its wattle gourbis, an ideal daytime resting place for *A. maculipennis*. In addition, a high spleen rate exists among the Arabs. Larval control on the local swamp was incomplete and adult control doubly important to protect key R.A.F. personnel working at nights. Plans to remove the village—the ideal measure—were not fulfilled, so all the gourbis were sprayed out twice weekly by the motor-driven sprayer. Malaria among these R.A.F. personnel was negligible.

An important point in considering anti-adult measures is the daytime biting habits of *A. maculipennis labranchiae*. Important observations made at Bone showed that, as well as during the hours of darkness, the female continues to bite indoors up to four and a half hours after sunrise, and starts one hour before sunset, also on occasions in the heat of the day. This has important applications in the spraying of tents and shelters (in particular ablution huts) *before use* in the morning. Troops exposed to this vector where spraying is not practicable should, when indoors (i.e. in tents, caves, stables, blockhouses, etc.), continue the appli-

cation of repellent to protect them until mid-morning. This daylight biting has not been recorded in the open air.

*Special Work.*—At Bone a technique of weed removal was developed by towing a drag from an amphibious jeep. The jeep itself is fitted with a propeller guard of expanded metal which is curved in shape, and wired over the propeller (the metal of the car is too thin for welding). The drag is a simple beam eight feet in length, pierced by rows of six inch nails; a ring bolt at each end carries the two ropes of attachment which are held by someone in the stern. A proper ramp, which can be made of beach netting or runway strips, is required for the launching of the jeep. A spare drag is kept ready on the bank so that when one is choked they may be interchanged by throwing ropes to and from the shore, thus obviating constant landing and waiting; the choked drag is cleaned while the spare is in use.

Enormous quantities of weed can be quickly removed.

### C.—Discipline.

Throughout North Africa District the importance of discipline as the key measure of malaria prevention was constantly stressed. By orders, personal letters, visits, and night inspections, discipline was maintained at a fairly high standard. The difference between British and P.O.W. discipline was noticeable, and was reflected in the higher P.O.W. malaria rates. The interest of units was maintained by publishing information from time to time, e.g. on the habits of *A. maculipennis*.

*Mepacrine.*—Bone has been the only area where mepacrine was taken throughout the season of 1944 in North Africa; Algiers was declared "mepacrine free" on June 3. Administration in the area concerned was good. Patients admitted to hospital with malaria were interviewed by the O.C., Malaria Research Team, and any evidence of laxity was, through his co-operation, followed up.

The contribution of mepacrine to the Bone malaria campaign cannot yet be computed, but by following up various units which were particularly exposed to malaria (either on the evidence of 1943, or anopheline density of the district in 1944), some measure of its value could be made.

### III.—EFFECT OF THE CAMPAIGN.

(a) *On Anopheline density.*—Very complete observations were kept at Bone but few figures were available from 1943 for comparison. Where available they show, area for area, a striking reduction. A visit to the Transit Camp in July, 1943, revealed very numerous blooded *A. maculipennis* in the tents. During a three weeks' stay in this camp in July, 1944, the D.A.D.H. found one *A. maculipennis* in a latrine. The anopheline peak was reached in 1944 the second week of June, varying slightly from district to district. This was five weeks before the malaria cases started.

After August 1 the anopheline population of the Bone Plain was minimal.

A more profitable comparison can be made between controlled and uncontrolled areas. At Morris (Bone)—where larval control failed—a count on June 25 in one stable yielded 5,000+ *A. maculipennis*. At Barral (Bone), an uncontrolled area, anopheline counts were steadily three to five times as great as the highest contemporary records from controlled areas.

The evidence of lay observers is unreliable, but officers and troops who were in Bone last year, and the local inhabitants, all comment on the lack of mosquitoes. On the other hand, in uncontrolled areas (Barral) or areas where break-throughs occurred (Morris, Zerizer) the anopheline counts were enormous, because extensive surface water was available for breeding.

It is only fair to point out that these results were obtained *without* the use of D.D.T.

Cold weather delayed the onset of breeding, but, judged by observations in uncontrolled areas, it certainly caused no eventual reduction in numbers.

(b) *On Malaria Incidence.*—A malaria campaign must ultimately be judged by the incidence of the disease in the population at risk. Nowhere in North Africa has malaria assumed epidemic proportions in 1944; and many of the sporadic cases have come from units (such as Train Guards) working in uncontrolled areas.

This is the weekly incidence of fresh cases in British troops (in cases per 1,000 of population at risk per week) :—

<i>Week ending (for 1944 week-end falls day sooner)</i>				<i>Algiers</i>		<i>Bone</i>	
				1943	1944	1943	1944
Jan.	1 .. ..	..	—	0.36	—	0.5	
	8 .. ..	..	—	0.20	—	0.4	
	15 .. ..	..	—	0.05	—	0.5	
	22 .. ..	..	—	0.20	—	0.7	
	29 .. ..	..	—	0.16	0.1	0.8	
Feb.	5 .. ..	..	—	0.18	0.1	1.1	
	12 .. ..	..	—	0.24	0.1	1.1	
	19 .. ..	..	—	0.04	0.1	1.5	
	26 .. ..	..	—	0.16	0.2	2.1	
Mar.	5 .. ..	..	—	0.26	0.2	2.4	
	12 .. ..	..	—	0.35	Nil	2.2	
	19 .. ..	..	—	0.27	Nil	3.4	
	26 .. ..	..	—	0.41	Nil	2.6	
April	2 .. ..	..	Nil	0.48	Nil	2.4	
	9 .. ..	..	Nil	0.31	Nil	1.6	
	16 .. ..	..	0.02	0.43	Nil	1.7	
	23 .. ..	..	0.03	0.28	Nil	2.3	
	30 .. ..	..	0.02	0.53	Nil	1.1	
May	7 .. ..	..	Nil	0.66	Nil	1.5	
	14 .. ..	..	0.03	0.61	Nil	0.5	
	21 .. ..	..	Nil	0.34	0.1	0.1	
	28 .. ..	..	0.03	0.28	0.1	0.3	
June	4 .. ..	..	0.04	0.34	0.2	0.1	
	11 .. ..	..	0.10	0.20	0.4	0.2	
	18 .. ..	..	0.07	0.15	1.3	0.3	
	25 .. ..	..	0.39	0.40	3.6	0.2	
July	2 .. ..	..	0.60	0.48	6.0	0.1	
	9 .. ..	..	0.60	0.27	15.4	0.4	
	16 .. ..	..	1.44	0.54	8.8	1.0	
	23 .. ..	..	1.16	0.65	23.1	1.7	
	30 .. ..	..	2.40	0.42	20.1	2.1	
August	6 .. ..	..	2.34	0.56	15.3	2.1	
	13 .. ..	..	2.90	0.29	9.5	2.4	
	20 .. ..	..	5.24	0.58	7.2	2.3	
	27 .. ..	..	1.98	0.46	5.4	1.25	
Sept.	3 .. ..	..	1.66	0.33	5.8	1.5	
	10 .. ..	..	1.04	0.29	4.2	0.7	
	17 .. ..	..	0.96	0.23	2.8	0.4	
	24 .. ..	..	0.86	0.30	2.4	0.4	
Oct.	1 .. ..	..	0.43	0.35	2.6	0.6	
	8 .. ..	..	0.56	0.20	2.1	0.7	
	15 .. ..	..	0.55	0.21	2.1	0.7	
	22 .. ..	..	0.68	0.20	2.5	0.3	
	29 .. ..	..	0.99	0.08	1.2	0.3	
Nov.	5 .. ..	..	1.30	0.14	1.2	0.3	
	12 .. ..	..	0.81	Nil	1.3	0.3	
	19 .. ..	..	0.54	0.07	0.8	0.3	
	26 .. ..	..	0.47	0.09	0.6	0.4	
Dec.	3 .. ..	..	0.58	Nil	0.5	0.3	
	10 .. ..	..	0.27	Nil	0.5	0.2	
	17 .. ..	..	0.20	Nil	0.5	0.7	
	24 .. ..	..	0.31	Nil	0.7	Nil	

(Including all allies  
except French)

Average Incidence per 1,000 population at risk per week.

BONE—

June–September, 1943 .. .. 7.7  
June–September, 1944 .. .. 1.0

ALGIERS—

June–September, 1943 .. .. 1.40  
June–September, 1944 .. .. 0.38

Length of Malaria Season.

*Bone.*—During 1943 the incidence was over 1·0 per 1,000 for twenty-two weeks. During 1944 the equivalent period was eight weeks. But in February, March and April, 1944, the incidence was over 1·0 per 1,000 for fourteen weeks, a legacy of suppressed cases from 1943; in fact the incidence in the true season never reached anything like this spring outbreak.

*Algiers.*—During 1943 the incidence exceeded 1·0 per 1,000 during ten weeks. During 1944 the equivalent period was nil. The lower malaria rate of 1943 was reflected in the absence of the spring peak such as occurred in Bone. The French civilian notifications (1944), though inaccurate, are also exceptionally low this year.

#### CONCLUSIONS.

It is difficult to assess the contribution of each factor in the malaria campaign. Weather, anti-larval and anti-adult measures, discipline, mepacrine and, above all, the cumulative effect of two years' work, each and all have combined in some degree to defeat the disease. There has been a striking reduction in malaria compared with 1944.

The object of the campaign, namely the uninterrupted progress of military work and the preservation of good health among British troops, has been attained. In addition, all available information has been passed to the French Civil Hygiene authorities in the hope that the experience gained may not be lost, and that work we have begun may continue to benefit this department of Metropolitan France.

## LAND FORCES ADRIATIC.

By Colonel J. T. ROBINSON, M.A., M.D.

It has been my privilege to be A.D.M.S. of Land Forces Adriatic for some considerable time. On taking up the appointment I was soon made aware of the unique work carried out by some of the units under command and the specialized nature of the medical organization and problems connected with the operational roles these units were destined to carry out. There are many who vaguely know of the existence of this Formation, but who have little or no conception of the units concerned nor of their operational achievements.

It is not intended to give details of the composition of all forces under Land Forces Adriatic since the medical organization of most of them conformed to normal regimental medical establishments. It is felt, however, that a short description of the history of some of these specialized units, their medical organization and associated problems, might be of interest to readers. The units concerned are the Long Range Desert Group, the Special Boat Service and the Raiding Support Regiment.

These units carried out their activities well inside enemy occupied territory and therefore had to be infiltrated frequently by air. Every man of all arms and services, including R.A.M.C., had to be parachute trained and all weapons and equipment had to be of a nature droppable by parachute. This meant that every man had to be a volunteer for duties of a hazardous nature including learning to drop by parachute.

The Long Range Desert Group and the Special Boat Service were organized on a regimental basis with H.Q. and squadrons; units of the latter forming patrols of varying strengths depending on operational requirements.

The Raiding Support Regiment, as its name implies, was organized on a regimental basis with H.Q. batteries and troops.

Detachments of each of these units frequently operated alone but later worked in collaboration with great success and daring.

In addition to these highly specialized units there were several Commando units under command; the medical organization of these is fairly well known and of them mention is made later.

### LONG RANGE DESERT GROUP

The L.R.D.G. came into being in 1940 due to the foresight of Major R. A. Bagnold (now Colonel), an expert in navigating the sand seas of the Libyan Desert. For some years prior to the War he and some friends, notably Major P. A. Clayton, *D.S.O.*, Major C. A. Prendergast, *D.S.O.* (now Colonel), and Major D. W. K. Shaw, *O.B.E.* (now Lieutenant-Colonel), spent many months each year in long treks through the desert west of Cairo and had accumulated a wealth of knowledge of this country and its scattered nomadic inhabitants; with the latter they had made many friends. Above all, they had learned that white men could exist in the sand seas for many months and that these could be crossed by modern transport.

Bagnold appreciated that all this experience could be of real value to the British Armies in operations against the Italian Army of occupation. He therefore offered to form a force which would be able to penetrate far behind the enemy lines; maintain watch on enemy movements and concentrations; ascertain locations of enemy H.Q., coastal defence guns, supply and ammunition dumps; harass enemy lines of communications; and in general to be able to keep Army H.Q. provided with a wealth of up-to-date information regarding all activities of the enemy. It was also proposed that surveys should be made by the force and detailed and accurate maps produced, since those in existence were devoid of practical information required for the movement of armies and their contents often grossly inaccurate.

It was fully realized by Bagnold that such a force could provide details of terrain and in

particular be able to ascertain whether ways could be found over which to lead strong mechanized forces. The knowledge of "going" was essential, and none were more capable of providing this information than Bagnold and his friends with the requisite personnel and equipment.

He obtained support to his suggestions from General Wavell, Commander-in-Chief, and in 1940 the Long Range Desert Group was born.

The initial problem was to obtain personnel since man-power was short throughout all units of the British Army at this period and was causing grave concern to the General Staff. Due, however, to the co-operation and interest of General Freyberg of the New Zealand Division, some 40 O.R. personnel were provided from the N.Z. Forces, also two officers, one of whom was the Medical Officer, Captain Frank Edmondson, and the other the Adjutant.

This small force first operated against the Italians in August, 1940, and were instrumental in the capture of Aujila from a considerably larger force of Italians.

Later the force expanded and operations were carried out in conjunction with the Free French Forces from French West Africa; in December, 1940, and January, 1941, Mourzouk with a garrison of 500 Italians was surrounded and wiped out.

The capture of Kufra Oasis from the Italians followed in March, 1941. This oasis was an important watering place for Italians and was a halting place on the air route to Abyssinia. After its capture the oasis served as an extremely useful base for the L.R.D.G. who originally were operating from Cairo. By the capture of this oasis the extent of the operational capacity of the Long Range Desert Group was considerably extended.

By December, 1941, the Long Range Desert Group was giving considerable assistance to the Allied Armies, harassing the Germans between Benghazi and Tobruk and providing all the information which they had taken upon themselves to produce.

Early in 1942 its operations were extended far into Tripolitania and, after the El Alamein retreat before the German advance, the Long Range Desert Group did considerable damage harassing the Germans and beating up airfields in Sidi Barrani and other coastal towns in Cyrenaica.

After the successful push back of the German armies at the battle of El Alamein in October, 1942, the Long Range Desert Group, by their detailed knowledge of the "going" were instrumental in leading the New Zealand Division in a left hook which cut the road behind the German retreat at El Agheila at the end of 1942.

In January, 1943, the Long Range Desert Group established their H.Q. at Hon in Tripolitania and were employed behind the German lines right up to the capture of Tunisia. Their last job in the Battle of North Africa was to lead the New Zealand Division and the Free French in another hook to outflank the Mareth Line into the plains of Tunisia.

A most excellent book "The Long Range Desert Group," by W. B. Kennedy Shaw, one time Intelligence Officer to this force and a recognized expert in desert navigation, has recently been published. It should be of interest to all who fought in the Western Desert in the Italian Campaign and later in the victorious battles against the Germans from El Alamein to the final defeat in North Africa.

In June, 1943, the L.R.D.G. went to Syria to train in the Lebanon in snow and mountain warfare and to do parachute jumping. Later they were employed in reconnaissance duties in the Islands of the Dodecanese.

One squadron of the Long Range Desert Group came under command of Land Forces Adriatic on latter's formation in early June, and the rest of this unit came under command in August, 1944. This force carried out considerable activities in the islands off Greece, Albania and Yugoslavia similar to those in the Western Desert and North Africa.

#### SPECIAL BOAT SERVICE.

By the end of 1941 there was formed in the Middle East, on the inspiration of Lieutenant-Colonel David Stirling, a small force of specially picked men known as the Special Air Service. Personnel were trained to drop by parachute, to march immense distances by day and night,

and to specialize in the destruction of aircraft (and of anything else) on landing grounds behind the enemy's lines. Stirling was assisted by Moyne, Fraser and Lewis; a quartette whose initiative, courage and endurance cost the enemy dear.

In its early months the force worked in conjunction with the Long Range Desert Group, upon whom they depended for navigators, signals, supplies and transport to get them, on completion of their task, back to British lines. It was quickly realized, however, that the force could operate with even more telling effect against the enemy if provided with its own transport, navigators, and signals.

By September, 1942, the force had changed its character. From the small band of fifty odd experts in aircraft destruction it had grown into a much larger force with its own navigators, signals and transport. The latter consisted of heavily armoured jeeps, supplies of ammunition and food being maintained by 3-ton lorries. The jeeps were specially equipped with Vickers' machine guns, five per jeep, smoke projectors and other suitable small arms. Each carried sufficient petrol, water and rations to do about 1,000 miles without having to depend on any replenishment from outside sources.

The damage this force did was considerable and one officer is known to have personally destroyed over ninety planes on the ground, which is, I understand, better than any R.A.F. Squadron.

The force later operated in collapsible boats against enemy shipping in the ports at night and did great damage and personnel became experts in the handling of small sea craft.

The Special Air Service grew considerably and sub-units operated from as widely separated areas as the Far East to the Western Front.

At this time there was in existence a Special Boat Section, the function of which was to work in conjunction with the Navy and carry out reconnaissance of beaches and also make specialized raids on enemy gun emplacements which were hampering naval shipping.

Personnel of this force operated in specialized portable canoes which could be carried by one individual and could accommodate two persons. These were usually carried in submarines and were launched at night, often in the dark near beaches. Considerable training was required to operate and get ready these canoes which, with experience, could be floated and manned within a few seconds of the submarine surfacing.

By the incorporation of elements of the Special Air Service and the Special Boat Section there was eventually evolved the Special Boat Service whose personnel underwent the dual training of the original Special Air Service and the Special Boat Section. The result was a body of men who were all parachutists and who possessed a wide knowledge of the handling of all types of small and large sea-going craft while some were expert navigators.

The Special Boat Service came under command Land Forces Adriatic in August, 1944, and carried out daring raids against opportunist enemy targets such as communications, isolated garrisons, headquarters, coastal defence guns and such like in Albania, Greece and Yugoslavia and adjacent islands. They were the first unit into Athens when it was recaptured from the Germans.

#### THE RAIDING SUPPORT REGIMENT.

By September, 1943, the idea of raising a unit entirely comprised of various support weapons to be used to help partisan and guerillas had formulated in G.H.Q. Middle East Force.

The idea was to raise a unit which would be used in small groups, trained to act independently, to fend for themselves, and to live in enemy occupied territory behind the enemy lines for any length of time and to harass and destroy the enemy where opportunity offered. In this capacity they would be invaluable to guerillas and partisans who, in most cases, were armed only with light personnel weapons.

The secondary role of the Regiment was to act as support troops to Commandos in a raiding role.

As with other specialist units mentioned, detachments were to be infiltrated where required. Every man, therefore, had to be parachute trained, and all weapons and equipment to be of a



nature droppable by parachute. This meant that every man had to be a volunteer and in response to an appeal over 3,000 officers and men volunteered. In October, 1943, the unit had obtained its first volunteers and training began. It grew into a sizable force consisting of batteries armed with anti-tank, anti-aircraft, 75 mm. Vickers M.M.G. and mortar weapons. Such obviously require considerable transportation which is carried out by mule convoys. This force operated in the Balkans in support of partisans and guerillas with considerable effect both before and since coming under command Land Forces Adriatic in 1944.

#### MEDICAL ORGANIZATION AND EVACUATION.

*Special Units.*—To conform to the requirements of these specialized units the Regimental Medical Organization, as would be expected, differed considerably from that of an infantry, armoured or artillery regiment. It was similar in many respects to that of the Commando unit, but differed in the fact that medical personnel were parachute trained and operated inside enemy territory with frequently no facilities for evacuation by sea or air.

Each had one medical officer but medical orderlies were all R.A.M.C. personnel specially selected and very highly trained in first aid and other medical duties. The number of such personnel varied in each of these units, depending on the unit strength. Each had at least one Senior N.C.O. and one junior N.C.O. to each patrol or troop. All had reached the standard of Nursing Orderly Class II but it was the policy to have all trained up to a standard of Class I; many had already passed this test after a period of six weeks' practical instruction in base hospitals in Italy, whose co-operation was willingly given and greatly appreciated. Numbers had also been trained in resuscitation and the giving of blood and plasma.

The importance of this high standard is obvious when it is realized that many small operations were often mounted at the same time, consisting of a few officers and twenty to thirty men dropped by air or landed by sea many miles away from H.Q. and well inside enemy territory. In such circumstances these patrols or troops were always accompanied by a medical orderly whose responsibilities were great; on him lay the task of rendering expert first aid, applying splints to fractured limbs, and ensuring that everything was done to get the casualty back in the best possible condition.

When several patrols operated from a central point it was the usual practice to establish a Casualty Collecting Post at this point where the Senior N.C.O. was located. Here more advanced treatment was given and dressings adjusted, if necessary, and facilities for resuscitation provided.

In operations of greater magnitude the R.M.O. dropped or was landed with the force H.Q. and set up a R.A.P. in rear of the C.C.P. This was usually sited under cover in a building where water was available, treatment and operating rooms could be set up and casualties could be detained.

Evacuation always presented innumerable difficulties and depended on the operation, terrain, strength of enemy, and the use or otherwise of a beach or air strip. Operations usually took place at night and lasted from five to ten hours. To maintain the element of surprise and keep the enemy guessing as to the strength of the force taking part, delay in getting away from the target area could not be entertained. This complicated the problem of evacuation, particularly if the force had sustained heavy casualties, since stretcher bearers had to be found from the fighting troops. In such circumstances disposal of the casualties depended on the severity of the wounds; but it has had to be accepted that seriously wounded, incapable of walking and too ill to move, must be given adequate treatment and left to the mercies of the enemy. Should such casualties be many, the medical orderly remained behind also. It says much for the initiative and excellent organization of these units that very few casualties were ever left behind.

Where evacuation by sea or air was possible, as on raids on enemy occupied islands, casualties were evacuated by co-operation with the Royal Navy and Royal Air Force; where such facilities were non-existent, casualties were taken with the force to their selected area of retreat inside enemy territory.

## COMMANDOS.

The normal medical organization for the reception and treatment of casualties and evacuation conformed to a more or less standard pattern.

Each troop was provided with a highly trained R.A.M.C. orderly assisted by a Commando orderly specially trained and permanently allotted for medical duties. Stretcher bearers were drawn from the fighting personnel as and when possible and casualties were evacuated to a Casualty Collecting Point.

At the C.C.P. was a Senior R.A.M.C. N.C.O. and one R.A.M.C. orderly. The M.O. usually took up his position here in the earlier part of the operations, moving back with the first casualties to the R.A.P. established at the H.Q. of the unit. At this point advanced treatment was given and dressings adjusted as necessary and resuscitation was provided. Evacuation from here depended on terrain and facilities available and might be by stretcher, mule, jeep or hand carriage.

The R.A.P. was normally sited in a building where water was available and accommodation for treatment, operating and detention of casualties was possible. Here the medical officer was located and had the assistance of two highly trained R.A.M.C. orderlies. Evacuation from here was again according to facilities available to a beach, and thereafter by sea, to nearest advanced hospital with co-operation of the Royal Navy. The time for evacuation from the area where the casualty was first wounded to beach-head varied according to terrain from five to seventy-two hours.

## ' MEDICAL EQUIPMENT.

It is obvious from what has been written that great care and detailed planning had to be exercised in providing adequate medical supplies to cover the needs of these units. Such equipment carried by the R.M.O. and R.A.M.C. Nursing Orderlies had to be packed so that it was really accessible and items required could be got at quickly. Much initiative was shown by the R.M.O.s who were given full licence to draw up their own requirements and train their orderlies in packing and the use of all items. It was found that such equipment could best be carried in a "Bergen" or similar rucksack. This rucksack is well known to troops trained in mountain warfare and has been adopted as the standard method of carrying medical equipment for these units. It has long been in use by the Commando units, the contents varying according to whether the medical equipment was required for troop or patrol orderlies, medical serjeant or R.M.O.

Parachute trained medical personnel were expected and instructed to drop with their equipment. Other items of equipment, etc., were dropped in special containers by parachute or brought in by sea and carried by any available means. R.A.M.C. personnel were specially trained in packing these parachute containers and became great experts, and all had to know details of contents.

It was the policy to hold reserves ready packed in case of a bad drop or damage to the containers and these reserves could be despatched at short notice and with no delay. Communication was maintained by W.T. between patrols and troops and the force H.Q. with rear link to H.Q. Land Forces Adriatic.

Throughout all operations there was never any shortage of medical supplies and no difficulties were encountered in making demands. This was largely due to excellent co-operation from Staffs of the Depot Medical Stores in Italy.

## OPERATIONS.

It is not proposed to illustrate all operations in which these units were engaged but it is considered that a few illustrations of medical problems would be of value. In the interest of security code names and actual locations are also omitted.

**Operation I.**

This may be taken as a model for a small scale Commando raid in the Adriatic. The force landed at night on a beach in a small cove south of a village where there was a German garrison

about 250 strong. A small detachment with a battery of the Raiding Support Regiment held the beach-head while the Commando unit moved forward to attack the German position. Air cover was provided by the R.A.F. and the roads on either side of the village were blown by partisans to prevent interference by German mechanized reinforcements. Evacuation of casualties was from R.A.M.C. medical orderly to a R.A.P. set up as far forward as possible by R.M.O. of Commando unit, thence to a small medical evacuation unit with a medical officer in the beach area. The country was rocky and steep and considerable help was given in carrying of casualties by local inhabitants. Evacuation from beach-head was carried out in co-operation with the Navy and at first M.S. Craft were used (speed about 25 knots). These high speed small craft provided inadequate accommodation and are unsuitable in turbulent waters and later evacuation was carried out by L.C.I.

One lesson learned from this operation was the possibility of the straggler casualty left behind. After the force had withdrawn information was received that a British soldier wounded in the abdomen had been found by partisans. An attempt was made to land a medical officer by sea at night but faulty reception prevented his landing. He was successfully dropped the next night and the casualty recovered and successfully evacuated. Since this episode it has been the policy to arrange for the M.O. to stay behind if there is any reason to believe casualties have been left unattended.

### **Operation II.**

The primary object of the operation was the occupation and securing of an island. Long Range Desert Group and Commandos maintained vigorous patrols on the mainland and adjacent islands preventing enemy interference; while a minor force of specialized units carried out the operation. It was realized that evacuation would be a serious problem as maintenance craft took two to three days to do the voyage to the nearest hospitals in the mainland. Two medical officers accompanied the force and arrangements were made with the Royal Navy for urgent casualties to be put aboard ships taking part, while R.A.F. were approached to provide a flying-boat. The operation was so successful that casualties were light and evacuation proved less difficult than surmised.

### **Operation III.**

This operation provides examples of practically every medical difficulty which can beset a combined operation on the mainland of the Eastern Adriatic.

(i) The rapidly changing G. and I. situation radically altered the original plan. What was to have been a forty-eight hour raid was reinforced and developed into a four-week campaign. Considerable hardship was experienced by the force and much improvisation was necessary to meet the situation.

(ii) The weather broke soon after the force landed and rain continued without interruption for about a week.

(iii) The country was as difficult as any force could encounter. The only road was under direct enemy observation and fire for most of its length and the steep rough mountains were covered with peculiarly unpleasant and tenacious scrub which made walking difficult. In fit men minor scratches and abrasions quickly became septic. The evacuation of wounded was an arduous and difficult undertaking necessitating a carry of 4,000 yards over a rise of 1,500 feet from R.A.P. to Beach Dressing Station.

(iv) The valley behind the coastal mountain range was intensely malarial and as no nets had been taken casualties were heavy.

(v) Shipping was limited as other operations were taking place elsewhere, thereby delaying the arrival of stores to improve conditions. A regular nightly Landing Craft Infantry (L.C.I.) service for the evacuation of casualties was arranged with the Royal Navy though rough seas made the voyage unpleasant for casualties.

(vi) Two medical officers accompanied the original raiding party but as this increased in size and the force became widely dispersed this number proved inadequate. Two additional medical officers had to be found and were put in later.

(vii) Due to the excellent co-operation of all services, conditions were quickly improved and evacuation went smoothly.

(viii) Red Cross supplies were obtained in generous quantities through the joint organization of St. John and the British Red Cross and did much to improve the comfort and spirits of casualties. At all times this organization has been of great assistance to Land Forces Adriatic and their efforts have been greatly appreciated.

Many other operations were mounted in which the forces employed varied considerably in strengths and objects. Each had its own peculiar medical problems and careful planning was essential in each. Sufficient, however, has been stated to give an indication of the interesting work carried out by Land Forces Adriatic and some of the medical difficulties encountered and overcome.

These operations illustrate two important points; the apparent uneconomical use of medical officers and the need for highly trained R.A.M.C. medical personnel. The former would no doubt provide interest to the Medical Personnel (Priority) Committee imbued with the idea that ratios of medical officers to combatant strength is a sound criterion on which to assess the requirements in medical man power. With the great limitation in available suitable combatant personnel for these highly specialized units it is of supreme importance to ensure avoidable waste from casualties, sickness and wounds does not occur. This has been achieved by the policy of ensuring that the number of medical officers and highly trained R.A.M.C. medical orderlies required are always available to meet the needs of each particular operation.

#### CONCLUSION.

The experience gained as A.D.M.S., Land Forces Adriatic, has been unique not only because of the units under command but by the fact that this formation is probably the only one which has had one A.D.M.S. during its whole existence; regrettably an ephemeral one. Nowhere could an A.D.M.S. have received more co-operation from the Commander (Brigadier G. M. O. Davy, *C.B.E., D.S.O.*) down to the most junior Staff Officer and the period of service with this formation will ever remain an association of the happiest recollections.

#### ACKNOWLEDGMENT.

My thanks are due to my D.A.D.M.S., Major K. B. Gibson, for his excellent records of operations; and to the officers of these special units for their help in providing historical notes. Without their help this article could not have been written.

My thanks are also due to Major-General W. C. Hartgill, *C.B.E., M.C.*, Director Medical Services, Central Mediterranean Force, for permission to forward this article.



## *Reviews.*

AN INTRODUCTION TO PHYSICAL METHODS OF TREATMENT IN PSYCHIATRY. By William Sargant, M.A., M.B.Cantab., M.R.C.P., D.P.M., and Eliot Slater, M.A., M.D.Cantab., M.R.C.P., D.P.M. Edinburgh: E. & S. Livingstone, Ltd. 1944. Pp. xii + 171. Price 8s. 6d. net.

This book has been written primarily for the young clinician in psychiatry, but it will be of considerable interest to all practitioners and also to Senior Mental Nurses.

In describing not only the technique of various physical methods of treatment in psychiatry but also the criteria for the selection of cases for these treatments the authors have tried to provide for a balanced view of the dynamics of mental illness, a view in which "the genetic, the somatic and the psychopathological all meet their due appraisal."

Several methods of treatment now in common use are empirical and the authors rightly justify their use, but where "much that is written is in the dogmatic strain" and where the techniques of treatment are described without discussion of rationale or controversial points, the inexperienced must be wary lest the "balanced view" be lost. Thus in achieving the virtues of lucidity and simplicity of presentation the authors may have provided pitfalls and dangers for the novice. This is perhaps inevitable in a book dealing exclusively with physical methods of treatment and it is suggested that the addition of a suitably selected bibliography to an enlarged second edition might meet this difficulty.

Every chapter abounds with valuable points of clinical wisdom, particularly in the sphere of the psychoses, and the authors provide much material for thought and further study in the fields of psychopathology, biochemistry and endocrinology. Throughout the book it is made abundantly clear that the successful treatment of mental illness demands a very high standard of clinical medicine from psychiatrists and the authors are to be congratulated on having produced an eminently practical and much-needed book which will merit a place in every psychiatrist's library.

HANDBOOK OF PRACTICAL BACTERIOLOGY. A GUIDE TO BACTERIOLOGICAL LABORATORY WORK. Seventh Edition. By T. J. Mackie, C.B.E., M.D., D.P.H., and J. E. McCartney, M.D., D.Sc. Edinburgh: E. & S. Livingstone, Ltd. Pp. 694 + index of 26 pp. Price 17s. 6d. net, postage 7d. home.

A book that has gone through six editions since 1925 is obviously an established favourite whose seventh edition will be cordially welcomed by all former readers. Newcomers may be assured that the reputation enjoyed by Mackie and McCartney is well deserved. Here is a volume for students and for all who must set up a laboratory in remote parts, make it work, and answer the many varied questions put to the bacteriologist by his colleagues. The chapter on filtrable viruses and the appendix summarizing recent advances are of the greatest value and form a notable contribution to the book. The chapters on fungi, on rickettsiæ, and on protozoa will appeal particularly to those who have to serve abroad.

J. W. H.

- (1) SYMPOSIUM ON RECENT ADVANCES IN MEDICINE, and
- (2) SYMPOSIUM ON RECENT ADVANCES IN SURGERY.—Reprinted by the United States Office of War Information from the Medical Clinics of North America for November and December, 1944. Philadelphia and London: W. B. Saunders Company.

In addition to papers by a number of Philadelphia physicians and surgeons, it has been possible to present in these Symposia a very valuable group of articles by members of the Medical Services of the Army of the United States who have had the opportunity to study the various aspects of military medicine and surgery.

## **Notices.**

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THE University of Edinburgh conferred the Honorary Degree of LL.D. on Lieutenant-General Sir Alexander Hood, *K.C.B.*, *C.B.E.*, M.D., F.R.C.S.E., Director-General of Army Medical Services, on June 23, 1945.

All ranks of the Royal Army Medical Corps and members of the Army Medical Services will unite in congratulations to Sir Alexander on this well merited honour.

We print the Laureation address as read by the Dean of the Faculty of Law.

A townsman of Leith before that burgh became part of Edinburgh, Sir Alexander Hood was educated at George Watson's College and this University, where in 1910 he graduated in medicine.

He joined the Royal Army Medical Corps in 1912, and since then his life has been spent in Army service, in the course of which he had held many important administrative appointments, culminating in his present post of Director-General of Medical Services at the War Office.

In this important office the promise which he displayed in 1938 as Deputy-Director of Medical Services with the British Forces in Palestine and in 1939 as Deputy-Director of Medical Services with the British Expeditionary Forces, has been fulfilled.

It has been his task to guide and control the expansion of the Army Medical Services from their small peace-time strength to the vast machine which now they represent. He had to attract to the Army men eminent in civilian medicine, and so provide the best service that the medical profession could offer. The skill with which he accomplished his work is reflected in the results obtained.

Two developments within the Army Medical Department of the War Office during his tenure of office call for special notice. The first is the creation of a directorate of Army psychiatry; the second is the institution of a directorate of medical research. For the first, considerable courage was demanded; for the second, great vision and faith. Of all branches of medicine, psychiatry has grown most rapidly during the war, and the Army now possesses a service that stretches from the front line to the base, and has been instrumental to a large degree in saving man-power.

Although Sir Alexander is now an administrator, he is still at heart a medical scientist. He has created a special directorate of medical research within the War Office, staffed it with men of high academic standing and repute, and created for them opportunities for work to be found in few academic institutions. Working in the closest collaboration with such bodies as the Royal Colleges, the Medical Research Council, the Ministry, and the Department of Health, he has taken a very active part in the direction of medical research, and has provided teams of research workers required for the investigation of special problems in different parts of the world from Burma to the British Army of Liberation. It can truly be said of him that no one in his generation has done more to encourage medical research and to provide facilities for its prosecution.

A man of action, competent in the application of medical knowledge to military affairs, a man of strong and attractive personality who became the focus of the loyalty of large numbers of civilians in uniform, Sir Alexander Hood is also a man of imagination.

His experiences during the war have taught him what the future of medicine might become, and in his recent Harveian oration delivered before the Royal College of Surgeons of England, he presented to that learned body his views of medicine as an instrument of human and social advancement.

The story of the Army Medical Services in the present war forms a noteworthy chapter in the history of medical progress, and it is right that, in this place from which so many doctors have gone forth, we should feel just pride in what has been accomplished. The University is glad to think that the Director-General of these services should be one of its own graduates.

I ask you, sir, to add to the honours which he has earned by so much distinguished service, the tribute of his Alma Mater, and to confer on him the Degree of the Doctor of Laws.

(From *The Scotsman*, Saturday, June 23, 1945.)

### ARMY MEDICAL DEPARTMENT BULLETIN

*A.M.D. Bulletin* No. 46 and Supplement No. 21, April, 1945, have now been published by the War Office. Distribution scale: one copy to every Medical and Dental Officer.

#### Article No.

#### SUMMARY OF CONTENTS.

347. *Fæces, Flies and Hepatitis*.—Evidence is presented which supports the view that infective hepatitis is an excremental disease.
348. *Another Virus by Mouth*.—The spread of poliomyelitis is probably similar to that of infective hepatitis; it is probable that both diseases can be spread in two ways: by airborne droplets, and, more important, by ingestion of infected material.
349. *Wound Infection and Nose*.—Staphylococci are the organisms most often responsible for wound sepsis. There are many nasal carriers of pathogenic staphylococci; those who attend to wounds must remember this and shape their technique accordingly.
350. *Yellow Fever Inoculation*.—This inoculation will convey only a false sense of security unless the vaccine is properly stored and used. An account is given of the recommendations on these points which have been proposed for international acceptance.
351. *Success or Failure in Scabies Treatment?*—A misguided practice in treating scabies is to put the patient in a bath shortly after he has been painted with benzyl benzoate emulsion. This, and other mistakes that lead to failure, can be avoided by following the methods described in an official pamphlet available to all medical officers.
352. *Penicillin Lamellæ in Ophthalmic Infections*.—Trials with lamellæ containing penicillin show that these have some advantages over solutions for treating external infections of the eye.
353. *University Vacancies*.—Two University posts are open to candidates in the Services: the Chair of Bacteriology at University College Hospital and the Senior Lectureship in Histology at Liverpool.
354. *Bumblng is Bad*.—Many doctors write badly because they do not recognize the virtue of making a point in a few short words.

*Supplement No. 21. Principles of Malaria Treatment*.—This does not give detailed regimes of drugs and dosage but it defines the proper objectives of malaria therapy under different circumstances and indicates how they may best be reached.

### 19TH GENERAL HOSPITAL.

PAST and present members of this Unit are advised that an Old Comrades' Association is being formed.

Will any Officer, Nursing Officer, Warrant Officer or Other Rank who is interested and is, or has been, on the strength of the unit please send a post-card giving name and present address to:—

Colonel James O'Grady,  
Stoneacre, Swinton,  
Manchester.

### ERRATUM.

#### THE TREATMENT OF DYSENTERY IN A FORWARD HOSPITAL.

Vol. lxxxiv, No. 4, April, 1945, page 174. The dose of Emetine should be grain 1·0 and not 1 gramme.

The Editor is interested to note that this misprint was pointed out by Dr. G. W. McCoy of the School of Medicine, Louisiana State University, New Orleans, to whom he expresses his thanks.





MESSAGE FROM HER MAJESTY THE QUEEN,  
COLONEL-IN-CHIEF, ROYAL ARMY MEDICAL CORPS.

THE Director-General, Army Medical Services, who sent the telegram below to our Colonel-in-Chief, has received the following gracious message from Her Majesty The Queen.

The Director-General,  
Army Medical Services,  
War Office.

My sincere thanks to all ranks for their loyal message on my birthday, which I have received with much pleasure.

ELIZABETH R., Colonel-in-Chief,  
Buckingham Palace.

The Private Secretary to Her Majesty The Queen,  
Buckingham Palace.

Colonels Commandant and all ranks, Royal Army Medical Corps, submit their most respectful greetings to their Colonel-in-Chief on her birthday.

The Director-General,  
Army Medical Services.

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Authors are alone responsible for the statements  
made and the opinions expressed in their papers.

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**Journal**  
of the  
**Royal Army Medical Corps.**

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***Original Communications.***

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OBSERVATIONS ON BAITED FLY TRAPS IN PALESTINE, 1943-1944.

By Lieutenant-Colonel D. M. BLAIR,

*Royal Army Medical Corps,*

AND

Staff Serjeants A. T. EVES, A. D. KELLEY and I. KENNAUGH,

*Royal Army Medical Corps,*

*From the Middle East School of Hygiene, M.E.F.*

[Received June 13, 1945].

INTRODUCTION.

If we believe that flies play an important role in the spread of excremental diseases, their elimination and destruction is a matter of great practical importance. There is, however, surprisingly little evidence directly incriminating flies as vectors of this group of disease organisms. The reports which have been published are quoted by each writer in turn, but little seems to have been done to add to the store of knowledge on this important matter.

Flies and excremental diseases in their times of incidence are so closely linked together that one is tempted to draw too definite a conclusion. From civilian experience it is stated that the principal fly vectors come from the common house-fly group but, when considering troops living under field conditions, too much reliance cannot be given to this view. Flies from the muscid group are the ones most likely to go inside buildings and kitchens and may well be the only type captured or killed indoors. In the field, however, food is often prepared, cooked and eaten out of doors and other types of fly may well act as efficient vectors.

The Army rightly teaches that prevention of fly breeding should be the aim of each and every unit and it is considered a serious breach of sanitary discipline if fly breeding in improperly disposed wastes is detected within a unit's camp confines. However well fly prevention is done, flies breeding outside the camp area may fly in from near-by towns and villages. This type of intruder fly, feeding as it may have done on infected human wastes produced by civilian cases of disease, is of course likely to be more dangerous than the camp-bred fly. A military unit should aim at a balanced anti-fly campaign with the attack on camp fly-breeding sites co-ordinated with a campaign of killing invading flies.

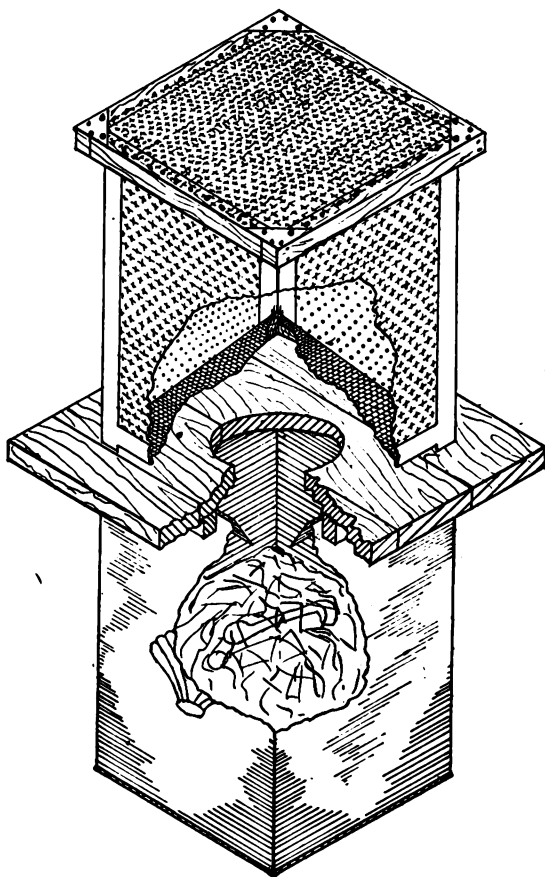
A variety of anti-fly weapons are made available for military units and these used in their proper place play a big part in keeping down the fly population. This article is concerned with one of these weapons only : the baited fly trap.

#### BAITED FLY TRAPS : IMPROVEMENT IN DESIGN.

Baited fly traps were used in the 1914-1918 War and drawings and descriptions are to be found in Sir Andrew Balfour's book " War against Tropical Disease." However, little use seems to have been made of baited traps in the years between the wars in the fly-infested parts of the world.

A trap similar to the one described by Balfour was made available for use by military units in the Middle East early in 1940. The traps were made of a wooden frame covered on top and four sides with wire gauze and into the open base was fitted a truncated pyramid of gauze. The trap was placed over a piece of fly-attractive bait set on a wooden board. The traps were never popular and even when well sited and baited the catches were not big enough to encourage units to continue to use them. The fly traps were easily damaged in transport and handling.

In May, 1941, at Mersa Matruh in the Western Desert of Egypt, Lieutenant Bruton, an officer of the Australian Imperial Force, introduced a trap new to the Middle East but well known in Western Australia. With this pattern of trap astonishing catches were made. In Mersa Matruh in June, 1941, catches at the rate of 4,500 flies an hour were easily made. Bruton's insistence on the need for a fresh meat bait and the large amount of wire gauze



required to make each trap were obviously limiting factors in the general introduction of the trap for Army use. The trap was a great advance on the previous design and introduced the principle of attracting flies to feed on bait in a darkened container from whence the replete fly was strongly attracted by sunlight upwards to the underside of the wire gauze cone. From June to September, 1941, about 200 of these traps were given a trial dotted at intervals all over the area of the Matruh Fortress defences and a striking reduction in the fly population was obtained.

By experiment it was soon found that Bruton's trap would catch flies with a bait of swill containing a few scraps of meat or tinned fish almost as well as with the fresh meat bait of eight pounds weight originally suggested. It was also found that the wire frame of Bruton's trap was liable to damage and deformation when being transported. For large scale manufacture and on grounds of durability, it was decided to substitute a frame made from a 4-gallon non-returnable petrol container. When this had been agreed to a shortage of wire gauze screening was experienced in the Middle East and the traps were issued to units without panels of wire gauze fitted in the sides of the tin. With only a gauze lid and gauze cone these traps were not properly illuminated. They were not popular with military units and in comparative trials with the Ordnance Standard fly trap now used were only 25 per cent as efficient.

Eventually with improved supplies of gauze a general issue of baited fly traps was made possible and it was with a model of this type that the experimental work to be described was carried out.

#### STANDARD BAITED FLY TRAP: MIDDLE EAST.

The traps are issued direct to military units through Ordnance Service channels but it has been found best to advise units to seek aid from Field Hygiene Sections on their siting, baiting and general maintenance. Once the unit sees how well the traps operate they are usually well looked after. The trap consists of three parts, a bait tin, a landing platform and a cage tin.

A. *The Bait Tin*.—Ideally this should be a 4-gallon petrol tin of the "non-returnable" type. Any other container of the same type and size will do. In preparing a fresh tin it is customary when removing the lid to leave a rim which is turned down into the tin to an angle of 45 degrees to serve as a larvæ trap. In very hot climates where fly larvæ may begin to migrate within a week this is probably a wise precaution. In the Middle East, however, the fly life cycle even in the most favourable weather takes at least twelve days and migration for pupation within one week must be rare. Into the bait tin each week is put the fly-attractive bait. The bait must be bulky and moist and should nearly half fill the tin. It is selected from the contents of the kitchen swill bin and should be chosen from items which are mushy and moist and will remain so during the week of decomposition in the bait tin. It is always advisable to have a proportion of meat or fish scraps in the bait and a bulky moist but otherwise not very fly-attractive bait can be livened up by the transfer of scraps from the previous week's bait, care being taken not to carry over any well-grown fly larvæ. In certain situations the odour produced by a trap may cause complaint and in such cases a fruit bait such as over-ripe figs, dates or tomatoes creates no smell and yet is attractive to flies. Other baits which can be used are cotton-seed cake and a yeast-oatmeal porridge. After a week's operation the bait will be swarming with fly larvæ and should be destroyed by burning. Burying of old bait is not advised; it is liable to cause intense breeding of flies. The larvæ seen in the bait tin are of all varieties except those of *Musca spp.*, which are rarely seen. The old bait tin can be used again and again provided it is cleaned out thoroughly each week.

B. *The Landing Platform*.—This should always be made of well-seasoned wood otherwise warping causes the cage tin to rock about and disturb flies preparing to enter. Metal platforms have been tried but as the trap is sited out in the open metal becomes too hot for flies to land. Landing platforms have been painted different colours but no one colour seems to

be more attractive than others. The platform soon becomes fouled with fly vomit and excreta and with the droppings of birds which are attracted to the trap by the harvest of flies provided. Landing platforms should be cleaned at least once a month. The central aperture in the landing platform should not be more than six inches in diameter or else too much light will enter the bait tin.

C. *The Cage Tin*.—The tightness of the fit of the removable gauze lid on the cage tin is most important and should be carefully attended to each time the lid is prised off in order to decant the dead trapped flies. It is also important to see that the aperture at the apex of the gauze cone is kept at  $\frac{1}{4}$  inch. It is as well to leave the rough points of wire sticking up, the palisade so formed helps to prevent flies which crawl about in the trap at night from falling through the aperture down into the bait tin.

The wire gauze soon becomes foul with the vomit and excreta of flies and rusting occurs. The rust scales cut down the light entering the trap and the scaling should be removed at intervals by brushing. An old tooth-brush is very suitable for this purpose. Under Middle East conditions a trap made with galvanized iron wire gauze will last at least one year. If a copper-wire or monel-metal gauze is used a much longer life could be expected.

D. *Siting*.—The trap must be situated out in the open air and given the maximum exposure to sunlight. It should not be placed in the shadow of buildings, trees and hedges and especially not too near a cook-house or dining rooms. At mealtimes the smell of cooking food may overcome the attraction of the trap and a plague of flies occur around and in the cook-house. The more hours of sunshine experienced the longer the trap will catch flies each day.

In a well-kept field camp the main problem will be to catch intruding flies and therefore traps are sited on the confines of the camp at intervals of about three hundred yards, in order to attract and imprison flies before they can reach dining and cooking places and infect food with excremental disease organisms they may have carried into the camp.

In barracks or static camps one well-sited trap will provide a reliable index of local fly prevalence and an unseasonable rise in the weekly fly catch should direct immediate attention to the searching out and destruction of fly-breeding material.

At times dogs and jackals cause trouble by overturning traps at night seeking the meat in the bait. When this occurs it is advisable to let the bait tin into a hole in the ground and hold the cage tin in place with nails fixed into the landing platform.

E. *Operation and Maintenance*.—The trap should be baited and rebaited on a regular weekly schedule. The trap begins to attract flies as soon as the sun shines. Flies alight on the landing platform and crawl through the  $\frac{3}{16}$  inch slit under the cage tin. Some flies that are not feeding may crawl out again and give the impression that they have escaped from the trap.

Usually, however, flies descend through the hole in the landing platform and feed on the bait. Female flies may then lay their eggs in the bait. Having fed, the presence of bait ceases to be the prime attraction and flies now ascend towards the light and alight on the under side of the gauze cone. Eventually they find their way through the aperture at the apex of the cone into the cage tin. There is no doubt that the buzzing noise made by flies trapped in the cage tin exerts an additional attraction. This can be demonstrated neatly by tapping the gauze lid gently; the imprisoned flies buzz and at once flies from the bait tin begin to catapult through the cone aperture. When the sun is high in the sky and the cage tin interior well illuminated a constant procession of flies can be seen crawling through the cone aperture and then flying up to rest on the underside of the gauze lid of the cage tin. The imprisoned flies soon become exhausted and fall down into the space around the cone and here they soon die. As the flies die, the space in the lower part of the cage tin fills up and eventually the light shining down into the trap may be reduced to a mere pencil. Flies will ascend this fine pencil of light directly into the cage tin just as readily as they pitch on the underside of the cone and crawl into the cage tin. In Palestine most of the flies trapped during the day are dead by the late afternoon. It is possible however that at nightfall a

few flies may recover, crawl about in the cage tin and escape through the cone aperture. In practice this is a small number and most of them are so damaged and exhausted that they cannot go far and are probably retrapped with the morning sun. Female muscid flies lay their eggs in their death throes and so the catch of dead flies should always be burnt along with the bait each week. At the weekly maintenance of the trap any flies still alive in the cage tin can be killed by placing the cage tin in the smoke of a fire or by passing it quickly through a flame.

It is useful to know that a standard trap filled with dead flies to the apex of the cone contains about 80,000 flies which is more than any self-respecting camp should be catching with one trap each week.

#### EXPERIMENTAL OBSERVATION OF A STANDARD TRAP.

In order to obtain actual performance figures for the trap, one was set up in an open site in Sarafand Camp on March 1, 1943. This hutted camp, situated in the coastal plain of Southern Palestine, is served by water-borne sewerage and a fairly efficient swill and rubbish removal service. It has always had a high reputation for camp cleanliness and the number of flies caught would be exceeded anywhere else in the neighbourhood. A standard trap maintained and cleaned every Monday afternoon has been operating on this site ever since. The bait was kept as constant in its constituents as possible and always contained some meat. Fly-breeding material in the vicinity and within the effective range of the trap was as constant as can be expected under field conditions. Because of predatory ants the trap was mounted on a small brick island surrounded by a water moat otherwise large numbers of dead flies are removed from the trap by ants and the counts would be inaccurate. In ordinary trapping this is a matter of no importance.

The weekly catch of flies was counted and classified if the catch was 2,000 or less. With larger catches, a representative sample was so treated and the result applied to the total week's catch by volume measurement. The classification of flies into species groups was done naked eye and was quite accurate for most groups. There were however a number of flies trapped from time to time which were not typical of the muscid group and were included in a category "other varieties," though there is little doubt that they belonged to this group. The classification was time consuming and had to be discontinued at the end of the 1943 season. In 1944 the total weekly catch was recorded (Table I).

TABLE I.—CLASSIFICATION OF FLIES TRAPPED, MARCH 2 TO DECEMBER 27, 1943 (43 WEEKS).

Type of fly	Trapped in 43 weeks	% of total catch
<i>Musca spp.</i> .. ..	386,946	76.61
Other varieties .. ..	67,055	13.26
<i>Fanina spp.</i> .. ..	22,993	4.54
<i>Lucilia spp.</i> .. ..	12,305	2.43
<i>Sarcophaga spp.</i> .. ..	5,955	1.17
<i>Mirella nilotica</i> .. ..	5,856	1.16
<i>Muscina stabulans</i> .. ..	2,577	0.50
<i>Wohlfahrtia spp.</i> .. ..	1,200	0.23
<i>Calliphora spp.</i> .. ..	520	0.10
Total catch	505,407	100.00

It is interesting to note the catching seasons of the rarer flies. *Muscina stabulans* was trapped from May to August; *Wohlfahrtia spp.* made their first appearance in July and had disappeared by early November; *Calliphora spp.* seem to be rare and were only caught before mid-July and after early November. The other types of fly seemed to have no seasonal fluctuation and formed a regular proportion of each catch. Although no differential counts were made in 1944, the same seasonal variation was noted.

A summary of the general information obtained with the standard trap is given in Table II. The data for 1943 covers only a 43-week period from March 2 to the end of the year and for

purposes of comparison figures are given for a similar period of 1944 as well as the complete figures for the year (Table II).

TABLE II.—SUMMARIZED RESULTS OF FLY TRAPPING, 1943-44.

Detail	1943 (43 wks.) 2.3.43 to 27.12.43	1944 (43 wks.) 29.2.44 to 25.12.44	1944 (complete) 28.12.43 to 31.12.44
1. Total flies trapped .. ..	505,407	362,637	365,716
2. Smallest Weekly Catch .. ..	0	53	32
On week ending .. ..	March 8	March 6	February 28
3. Largest Weekly Catch .. ..	44,864	57,447	57,447
On week ending .. ..	November 29	May 1	May 1
4. No. of Catches 0 .. ..	10	6	13
No. of Catches 701 .. ..	10	21	23
No. of Catches 7,001 .. ..	14	13	13
No. of Catches 21,001 .. ..	5	1	1
Over 35,001 .. ..	4	2	2

A simple interpretation of the weekly catch totals can be made as follows :—

Under 100 flies a day .. ..	unnoticed
100—1,000 flies a day .. ..	flies no nuisance
1,000—3,000 flies a day .. ..	troublesome
3,000—5,000 flies a day .. ..	very troublesome
over 5,000 flies a day .. ..	seriously interfering with work and efficiency

Weeks during which more than 1,000 flies a day (7,000 per week) are caught from the "fly season." In 1943, the season totalled twenty-three weeks and in 1944, sixteen weeks. A considerable variation in the catch week by week occurred during the year.

With the aid of meteorological data kindly supplied by Dr. Feiger, Department of Civil Aviation, Palestine, attempts were made to correlate fly catches with climatic measurements, such as maximum, minimum and mean temperatures, hours of sunshine and relative humidity. The only factor which seemed to have a bearing on fly catching was the mean daily temperature averaged for the week.

It will be noted that the temperature range which encourages the production of flies to be trapped lies between 15° C. and 23° C. (59° F. and 72° F.). When the mean temperature is below 15° C. fly catches are small as is generally so during the first quarter of the year. When the mean temperature rises above 23° C. and remains above this level then fly catches are small also. The steeper the rise and fall of the mean temperature curve through the critical range of 15° C.—23° C. the shorter is the fly season. A point probably of little importance is that during the critical range if the mean temperature from week to week varies more than 2° C. up or down then the fly curve is disturbed in its even trend.

The relation between fly density as estimated by standard baited trap catches and weekly mean temperature may be of some practical assistance in epidemiology. If there is any real association between fly prevalence and excremental disease, once fly catch and temperature figures for an area over a period of years were available, it might be possible to forecast conditions favourable to fly prevalence and give about three weeks' warning of epidemics of excremental disease and so give time for the institution of a thorough campaign of fly destruction and searching out of fly-breeding sites.

#### CONCLUSIONS.

(1) Baited fly traps made and used in accordance with the principles first introduced in the Middle East by Lieutenant Bruton, A.I.F., have proved themselves one of the best aids for large-scale adult fly destruction. They are easy to make, cheap and require maintenance and re-baiting at weekly intervals only.

(2) The traps merit wider use in tropical rural sanitation projects than they received after the last war. Destruction of insect vectors of disease at their breeding places will always be

a prime principle in the control of insect-borne disease but experience in the field during the present war has shown that an attack against the adult insect plays a big part in successful control especially when quick results are wanted. This view is of course now widely accepted in the fields of malaria and typhus fever control and may prove to be of value in limiting fly-borne disease.

(3) It is suggested that standard baited fly traps provide an accurate index of fly prevalence and if correlated with temperature and other climatic factors may permit the forecasting of epidemics of fly-borne excremental disease.

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# SOME EXPERIENCES IN THE TREATMENT OF VENEREAL DISEASE AMONG BRITISH TROOPS IN IRAQ: OCTOBER, 1941, TO SEPTEMBER, 1943

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IN October, 1941, a Combined General Hospital (Indian), consisting of one hundred British beds and one hundred Indian beds, commenced work in Baghdad. This hospital was entirely given over to the treatment of venereal disease. In September, 1942, this hospital packed up and moved elsewhere, but left behind a nucleus of its staff which were to continue treating venereal disease. This nucleus, together with one hundred beds for British troops, and one hundred for Indian troops, was attached to another hospital, also in Baghdad, the continuity of the work thus being maintained without a break. This arrangement was continued till the latter end of September, 1943, when, owing to the great reduction in the number of troops in the Command, it was finally terminated. This Centre in Baghdad received all cases of venereal disease from the immediate neighbourhood and from the country north and north-east of Baghdad—Mosul, Kirkuk, Khanaqin, Hamadan, Kermanshah and other places just inside the Persian border. A larger Centre at Shaiba drained the south of Iraq, and Persia South of Ahwaz. Teheran and its neighbourhood were catered for by a Centre in the Persian capital.

This paper deals solely with the British troops which passed through the Centre in Baghdad during the period from October, 1941, to September, 1943, for all of which time I was in charge.

Our accommodation throughout this period was tented—for patients, treatment rooms, offices and laboratory work. The climate was most variable, ranging from 120° F. in the shade, and sometimes higher, during the summer months, to 15° F. of frost on one occasion during our first winter. Sand and dust storms were another trial, occurring throughout the year, and rain and mud during the winter months. For the first year we had very little specialized equipment, apart from the usual surgical equipment of a General Hospital, for dealing with venereal diseases, but during the second year we lacked little. Our dark-ground examinations were carried out in a tent and our source of illumination was the sun reflected from a mirror—a trying business during the heat of the summer and an exasperating business during the winter when the sky was cloudy. Blood tests were carried out in a neighbouring field laboratory. Wassermann's were performed as the routine test and a Kahn on every positive result or by request.

Although the Centre had one hundred beds, there were times when this number was exceeded and then patients were evacuated to the larger hospital at Shaiba. The cases chosen for evacuation, whenever possible, were soft sores which had had three dark-ground examinations and a preliminary blood test, diagnosed cases of syphilis already under treatment but still with an unhealed primary lesion, and, at times, chronic cases of gonorrhœa. Owing to this forced evacuation of cases before they were fit to return to duty, I do not know the total duration of stay in hospital of the majority, nor, in some cases, the final diagnosis. In reading the figures which appear during the course of this paper this fact must be taken account of, and special reference will be made to it where necessary. Consideration must also be given to the fact that I have written this paper in India where I have not recourse to my original records which remain in Iraq. The figures which I quote are all from notes which I compiled before leaving Iraq in December, 1943.

The records which I maintained in the Centre were complete histories of every case, and these records I kept in those large and useful Army (Indian) books—I.A.F.Z. 2068—each book having its first few pages in the form of an index from A to Z. Each patient on admission started off with a fresh page, which as a rule gave plenty of space for all one had to write. These pages were serially numbered, and when one volume was finished the serial numbers were carried on to the next volume. When a man attended as an out-patient, or if he got readmitted to hospital, it was a very easy matter to turn up his old record and carry on with it. On discharge from hospital his I.A.F. 1247 and other documents were prepared from these books.

The higher administration and instructions relevant to venereal disease varied during these two years. During the first year, when we were successively British Troops in Iraq and then Tenth Army, venereal disease came under a consultant dermatologist, who also dealt with skins. During this period each patient on discharge from hospital received an A.F. I. 1247 (venereal case card). This card, on completion of surveillance or treatment, was sent to the consultant dermatologist for perusal and final disposal, this being the original peacetime practice in India. During the second year venereal disease came under an Adviser in Venereology, the Command then being known as Paiforce. On discharge from hospital each man was then given a small booklet (I.A.F. 1247A, equivalent to the Middle East V. 15) in which was written a brief summary of his case, and in which were printed columns for injections, gonorrhœa surveillance or the results of blood tests. This booklet the soldier was instructed to keep in his pay book, and to produce it each time he reported for treatment or examination. An I.A.F. 1247 was also completed in full and posted to the soldier's unit, where it was the duty of the unit medical officer to keep it up to date from any entries which might be made in the 1247A. On completion of surveillance or treatment both books were returned to the venereal centre which originated them. There the books were perused by a specialist in venereology and disposed of to Second Echelon.

During these two years the numbers of British troops in Persia and Iraq varied greatly. There were rapid and sudden influxes of troops from India, from the Middle East and from Britain. These troops might stay for a few months in the Command before moving off again to the Middle East, to North Africa, and later to Sicily. It was not altogether surprising, perhaps, that many of their venereal case cards never found their way back to Paiforce. Towards the end of the second year, perturbed on account of the large number of cases on my books which had no entry subsequent to their discharge from hospital, I circularized all these cases with the following letter :—

Subject : *V.D. TEST OF CURE.*

No..... Rank..... Name.....

The a/m BOR was treated for..... in this hospital from..... to.....194 . No record has yet reached this hospital showing whether this man has had a Final Test of Cure. If a Final Test of Cure has been carried out on this man please forward the date and results of the test to this hospital. If he has not had a Final Test of Cure please arrange for him to have one carried out at the nearest V.D. Hospital and forward the results to this hospital.

This letter was sent to every case, except cases of syphilis, about whose final disposal I was unaware. Unfortunately I left Paiforce before replies could be received from all of them. But such replies which arrived before I left were most gratifying, and showed that commanding officers and medical officers, despite their operations in North Africa, and landings in Sicily, were making efforts to have final tests of cure carried out on their men. An analysis of the replies to this circular letter would be most interesting, but, as far as I am concerned, an impossibility as the replies remain in Baghdad.

#### ANALYSIS OF ADMISSIONS.

The total number of cases of venereal disease which passed through the Centre during these two years was 2,270. This figure includes cases which were readmitted, either for a

relapse or on account of a second infection. Out of this number there were 54 cases which had a double infection, either gonorrhœa and NYD. VS., or gonorrhœa and syphilis. There were 58 admissions, of officers.

Of first admissions, excluding all readmissions, the total was 2,067. The percentages of the various diseases works out as follows (these being the diagnoses on discharge from hospital):—

Gonorrhœa ..	29%	Syphilis .. ..	14%
NYD. VS... ..	35%	Urethritis .. ..	15%
Warts, penile ..	1%	Balanitis .. ..	6%

In these figures I have made no mention of lymphogranuloma inguinale. That there were cases of this I do not deny but, for two reasons, I always diagnosed them NYD. VS. The first reason being that no Frei antigen was available. The second reason was that the majority of cases which I saw having large masses of enlarged inguinal glands, suggestive of lymphogranuloma inguinale, also had some penile lesion, and giving them the diagnosis of NYD. VS. was the safest method of ensuring that they had blood tests subsequent to discharge from hospital.

#### GONORRHŒA.

608 cases of fresh infections of gonorrhœa passed through the Centre. Some of these cases were already diagnosed and under treatment when they reached me, others were cases which had become chronic and were evacuated to the Centre in Baghdad for further treatment. The treatment for all fresh infections was sulphapyridine. Supplies of sulphathiazole were never sufficient to enable it to be used as a routine.

Two different dosages of sulphapyridine and routine management of the cases were employed, and are referred to as Series A and Series B in the following table of comparisons:

	Total cases	Average stay in hospital	Cured with one course of M & B 693 "X"	Cases requiring additional treatment "Z"	Relapses of "X" "Z"	
Series A ..	271	18.8 days	81.9% in 12.1 days	18.1% for 44.1 days	8.6%	5.8%
Series B ..	147	16.0 days	82.9% in 14 days	17.1% for 33.8 days	4.9%	8.0%

In collecting the cases for these two comparisons I have not included any cases which had a double infection, no cases which had already commenced treatment before they reached me, nor any cases in whom there was any doubt as to whether they were fresh infections or relapses of old infections.

In Series A the patient received  $3\frac{1}{2}$  grammes of sulphapyridine daily for seven days, and was given irrigations of his anterior urethra twice daily with 1 : 8,000 potassium permanganate. In Series B the dose of sulphapyridine was 8 grammes on the first day, followed by 3 grammes daily for four days, given in doses four-hourly, day and night. He received no irrigations and was kept in hospital for fourteen days, having frequent examinations of early morning smears and two routine prostatic massages before being discharged.

Drug rashes occurred in eight cases in Series A, and in one case in Series B. These cases were only seen during the summer months. The rash, appearing first as a bright red scarlatiniform erythema, and within two days becoming confluent, was only seen on those parts of the body which had previously been exposed to sunlight. After a further three or four days it faded away. There were no constitutional symptoms while it lasted.

One case of particular interest must be mentioned. An elderly man, with fair hair and blue eyes, was admitted with a fresh infection of gonorrhœa. I commenced him on the routine course of sulphapyridine. After his first 2 grammes I stopped it, the man having developed an acute erythema and œdema of his face, hands and arms. This developed into a localized exfoliative dermatitis of these regions. He recovered from this. Meanwhile he had developed

a sore on his penis. Although repeated dark-ground examinations of the serum from this sore failed to show the *Treponema pallidum*, his blood eventually showed a W.R. ++ and a Kahn + 3, and the diagnosis of late primary syphilis was added to his previous diagnosis of gonorrhœa. Cautiously I commenced him on anti-syphilitic treatment, fearing a flare-up of his recent dermatitis. However, no such flare-up occurred and I was able to get him on to the full routine arsenic-bismuth course. Meanwhile the sore on his penis remained unhealed. One day I applied sulphanilamide powder to his sore. The following day his face was red and swollen. I stopped the sulphanilamide powder at once and in a few days his face returned to normal. He continued his anti-syphilitic treatment without any untoward effects, although his gonorrhœa remained uncured.

Time is a great healer, and maybe it was only time which cured some of the chronic cases. Nevertheless, some of these cases cleared up when given a second course of sulphapyridine. Cases which had been hanging fire for several weeks sometimes responded to sulphanilamide. The passage of straight and curved sounds was employed in suitable cases, likewise prostatic massages. Artificial hyperpyrexia, induced by  $\frac{1}{2}$  c.c. T.A.B. vaccine in 5 c.c. saline intravenously, repeated three or four times at three day intervals, was of benefit in some cases. A urethroscope was available during the second year, but its use was limited being non-operating in type. Gonococcal vaccine was not available.

#### URETHRITIS.

303 cases passed through the Centre. Under the diagnosis of urethritis I always included those cases which to my mind are neuroses, but which are more correctly placed under that grandiloquent term urethrorrhœa. Young, excitable men, who, in many instances, had just had their first sexual intercourse and, being full of the horrors of venereal disease fear the worst for their indiscretion. They know a little, and every morning they milk their urethra to see if they have any discharge. And quite often they see what they imagine to be a discharge and at once report sick. They report sick early, within three or four days of the intercourse, and on examination can sometimes, but not always, produce a mucoid drop which proves to contain only epithelial cells bruised from their urethral wall and some excessive normal urethral secretions. Their urines are clear. Their treatment consists of a few reassuring words together with a simple explanation of the cause. I will cite one extreme case as an example. A young man reported sick and was admitted to hospital as an "NYD. Urethritis." On questioning him I learnt that he had visited a prostitute a few days previously, but, being unable to produce an erection, did not have connexion with her. The only contact which his penis had with her was her hands. His "discharge" proved to be only a few epithelial cells, and his treatment was reassurance. That it is a misnomer to call these cases urethritis I fully recognize, but it serves a most useful purpose in that they can all be placed under surveillance for three months and receive a blood test at the end of that time. Too many blood tests cannot be taken where there is an acknowledged intercourse with a prostitute in those parts of the world.

Under the heading urethritis two other groups emerged. The non-specific urethritis which may be caused by a variety of organisms other than the gonococcus, and the urethritis which is a legacy of a previous attack, or attacks, of gonorrhœa, but in whom the gonococcus was not demonstrable by our available methods of diagnosis. The line of demarcation between these two types was not well marked. But an arbitrary differentiation between the two groups can be made. The non-specific urethritis giving no history of a previous infection, and in whom no gonococci can be found but only secondary organisms, is an entity in itself. The incubation period may be long, perhaps as long as two months. The treatment for these cases was 1 : 8,000 potassium permanganate irrigations, sulphanilamide by mouth (3 grammes daily for four days), and T.A.B. hyperpyrexia. Complications were not seen. In those cases of urethritis which were most probably the legacy of previous gonococcal infection the treatment was difficult and exasperating, complications occurred and the prognosis was indefinite.

## NYD. VS. (NOT YET DIAGNOSED—VENEREAL SORE).

Not counting any cases which had a double infection, 645 cases were discharged from the Centre with the diagnosis of NYD. VS. Unfortunately, as I have already said, I left Iraq before all the replies to my circular letter had returned, and so I must remain ignorant of the ultimate fate of these cases. Of these 645 cases, 125 were evacuated to Shaiba before their sores were healed. Of the remaining 520 which were treated and discharged as cured from the Centre the average duration of stay in hospital worked out at 15.9 days. The longest stay in hospital before being discharged was sixty-two days.

Let me make it clear now that every case with even the slightest abrasion on the penis (sustained during coitus), and which was not proved to be syphilis, was diagnosed NYD. VS. on discharge from hospital, and fortnightly blood tests demanded for three months. This diagnosis resulted solely from the elimination of syphilis. No effort was made to isolate or distinguish the organisms responsible, nor were any intradermal tests available. The routine employed was the standard Army one of saline dressings, three dark-ground examinations and blood tests. The treatment adopted for a clinical soft sore, after three dark-ground examinations had failed to reveal the *Treponema pallidum*, was sulphanilamide by mouth—two tablets three times a day for four days, making a total of 12 grammes. Of the value of sulphanilamide in these cases I have no doubt whatever, and its efficacy can only be described as miraculous. So excellent were the results that local treatment of the sore mattered little, provided it was kept clean and an efficient drainage established.

These 645 cases of NYD. VS. I have classified into four groups.

(1) The traumatic group. 63 cases: All cases of abrasions and other traumatic injury sustained during coitus which did not proceed to ulcer formation and which were on the genitalia or pubic region are placed in this group.

(2) No adenitis present. 454 cases: The typical, small, multiple, irregular ulcers with yellow purulent bases and ragged undermined edges, usually found on the coronal sulcus of the penis, form the largest group. There is very little surrounding inflammation or reaction. There is usually some pain. There is no destruction of tissue, and when healed there is no scar.

(3) Inguinal adenitis marked. 122 cases: In this group glandular involvement of the inguinal lymphatic glands is the predominant feature, either with an active sore, usually single, or the scar of a healed sore. As previously explained I never made the diagnosis of lymphogranuloma inguinale. Clinically, this group can be subdivided into the latter condition, where the picture is characterized by large, slightly tender, solid inguinal glands, which often persisted for months and frequently relapsed, and for whom intravenous T.A.B. acted as a specific, and into those cases having red, tender, fluctuant "buboes." These "buboes," if treated with rest in bed, sulphanilamide by mouth and local heat, will, in most cases, resolve. Some, however, required aspiration with a wide-bored needle. Incision of these "buboes" is seldom required, and if performed may result in a chronic suppurating sore in the groin which may take many weeks to heal.

(4) The phagedenic ulcer. 6 cases: Most of the cases in this group which I saw got their infection in Persia and not in Iraq. They are rapidly spreading ulcers producing much surrounding inflammation in the tissues and great destruction, especially if there is not efficient drainage and there is a phimotic prepuce. The patient suffers much pain and runs a temperature of 101/103° F. The discharge from these ulcers is most particularly foul smelling. Lymphatic glandular involvement is not common. The first essential in the treatment of these cases is the establishment of good drainage which, in all phimotic cases, can only be achieved by a dorsal slit. Thereafter, I have got excellent results with the routine four-day dosage of sulphanilamide. As an example of the destruction of tissue which can result from these ulcers, I had one man, who, when his ulcer had healed, was left with a glans penis the top half of which only remained from a coronal section passing from his external urinary meatus to his coronal sulcus, leaving the channel of his urethra exposed on the under surface

of his glans penis. This man had a dorsal slit performed, but unfortunately not early enough.

#### SYPHILIS.

The total number of cases of syphilis admitted to the Centre during the two years was 309. The majority of these were fresh cases which were diagnosed in the Centre, but there were also a small number which were admitted to the Centre subsequent to diagnosis, usually on account of some complication. Of these 309 cases, 75 were evacuated to Shaiba before their primary lesion was healed and they were fit to return to duty. Of the remaining 234 cases which were discharged to their units fit for duty, these men spent an average of 25.9 days in hospital. The longest stay in hospital was 116 days, although one man with a concurrent attack of gonorrhœa remained 126 days. Each man received an average of three injections of arsenic and bismuth before being discharged from hospital.

The following list of sources of infection will emphasize the dispersal of the patients, both before and after admission to hospital, and the impossibility of keeping in touch with them.

Baghdad ..	67	Hamadan ..	25	Egypt ..	9	Khanaquin ..	3
Mosul ..	51	Kermanshah ..	20	Ahwaz ..	7	S. Africa ..	2
India ..	31	Teheran ..	18	Syria ..	4	Elsewhere ..	6
Basra ..	27	England ..	13	Palestine ..	4	Unknown ..	22

The different stages of the disease on diagnosis worked out as follows :

Primary (T.P. positive : W.R. negative) ..	107 cases
Late primary (T.P. positive : W.R. + +) ..	46 cases
(T.P. not found : W.R. + +) ..	86 cases
Secondary rash (W.R. + +) ..	48 cases
Late secondary (No active lesion) ..	22 cases

No cases of neurovascular syphilis were admitted.

The drugs at our disposal varied. The majority of our injections were intramuscular, and these were associated with very little pain, apart from the initial one or two injections which were always more painful. The drugs used were "sulphostab," "sulpharsphenamine," and "MAB," with occasional small supplies of "NAB" and, during my last few months "maphar-side." The bismuth preparations available were "bismostab" and "bisglucol." Approximately two thousand injections each of arsenic and bismuth were given during the two years.

Before I proceed to outline the toxic effects encountered, I must once more refer to the conditions under which we were working. We would diagnose a case, commence treatment, and, once the sore was healed or the active stage passed, discharge the man back to his unit. Under unit arrangements the man's further treatment was continued. Provided the man developed no toxic reactions he would not be seen again by the Centre. And even if he did develop any it is quite possible that his unit might have moved out of the Command.

Eight cases developed toxic effects attributable to bismuth. The average amount of drug administered before these effects became apparent was 3.4 grammes, i.e. after 17 injections. In seven of these cases the only sign was an albuminuria, but two of these seven cases also showed a gingivitis associated with bad dental sepsis. The eighth case was one of gingivitis alone. In only three of the cases was the total albumin estimated, and this varied from 0.1 per cent to 0.05 per cent. One case of albuminuria had an old history of chronic osteomyelitis of the leg.

The scheme of treatment used was the standard Army schedule—weekly injections of 0.6 gramme arsenic, and 0.2 alternating with 0.3 gramme bismuth, for ten weeks, a rest period of four weeks, and then repeated a further three or four times.

At no time during this period of two years did jaundice—"infective hepatitis"—appear in an endemic form among men receiving injections of arsenic as out-patients, or in-patients, in this Centre. As already pointed out our patients came from great distances, and their treatment, after discharge from hospital, was continued under unit arrangements. Never

theless, a small number of men, averaging between ten and twenty a week, who were stationed locally, did attend the Centre once a week for injections of arsenic and bismuth. It is from observation of these men that the opening sentence of this paragraph is based. Since returning to India I have been amazed by the numbers of men seen on any out-patient injection day who have entries in their venereal case cards saying that they have had jaundice and are to receive no arsenic for six months.

Whether this freedom from such a complication was due to the fact that I have always boiled my syringes between each injection, or to the fact that the majority of our injections of arsenic were given intramuscularly, are points which merit much consideration.

Five cases of jaundice following injections of arsenic were admitted to the Centre. In two of these cases definite prodromal signs of intolerance to arsenic appeared before the icterus—urticarial rash, purpuric eruption and rigor in one of the cases. A third was a case of late secondary syphilis who developed jaundice after his twenty-fifth injection. Three months after his jaundice had cleared his W.R. and Kahn remained strongly positive, despite continuance of his treatment with bismuth. The remaining two cases admitted were probably cases of catarrhal jaundice, unconnected with arsenical intolerance.

One case of purpura was sent to the Centre. His attack commenced after his twenty-fifth injection, and consisted of hæmorrhages from all mucous membranes. When I saw him he was quite well and fit, apart from a large area of skin on his right arm which was discoloured by a subcutaneous hæmorrhage.

There were four cases of mild dermatitis. They all took the form of an eczematous condition, affecting mainly the hands and feet, which cleared up rapidly when the arsenic was stopped. They all had a previous history of skin trouble.

Exfoliative dermatitis occurred in three cases. These all occurred early on in treatment, after their fourth, sixth, and eighth injections of arsenic. They all recovered but remained in hospital for periods of sixty-two, seventy and one hundred days. One of these cases after recovery developed a well-marked pigmentation of the skin of the whole body.

Finally, in this summary of toxic effects attributable to arsenic there were two deaths.

*Case 1.—Corporal, aged 28.*

16.5.42: Admitted to hospital. No previous history of V.D. History of exposure seven days previously. Sore on penis seen one day ago. C.O.E.—Ulcer on inner surface of prepuce discharging serous fluid. Prepuce only partly retractable. W.R. +.

18.5.42: Serum for TP: Negative. Inguinal adenitis present—left groin. Urethral smear: GC —, PC ++, EC ++.

19.5.42: Serum for TP: *Positive*. Prepuce swollen.

20.5.42: Anti-syphilitic treatment commenced. Sulphostab 0.45, Bi. 0.2.

23.5.42: Swelling of prepuce less.

26.5.42: Sulphostab 0.6, Bi. 0.2, I-M. (2).

28.5.42: Prepuce more retractable and urethral orifice visible.

2.6.42: Prepuce retractable; sore healed. Sulphostab 0.6, Bi. 0.3. Discharged from hospital.

9.6.42: Marked degree of phimosis with penile warts. To return later for circumcision. Sulphostab 0.6, Bi. 0.2, I-M. (4).

15.6.42: Readmitted to hospital. Large tender gland in left groin. Sulphostab 0.6, Bi. 0.3, I-M. (5).

17.6.42: Commenced four-day course of sulphanilamide (3 grammes daily).

21.6.42: Swelling of gland in left groin still present, but now quite painless.

22.6.42: Circumcision performed under chloroform and ether.

30.6.42: Stitches removed; wound healing.

2.7.42: Redness and some swelling around circumcision wound. Sulphostab 0.6, Bi. 0.2, I-M. (6).

3.7.42: Commenced second four-day course of sulphanilamide.

7.7.42: Wound now clean and healing.

9.7.42: Sulphostab 0.6, Bi. 0.3, I-M. (7).

10.7.42: Partial collapse; temperature normal; skin cold and moist. Very lethargic; only co-operates with great difficulty, but appears to understand what is said to him although he does not reply. Appears to complain of pain in his throat. T.W.B.C.: 7,400.

11.7.42: Condition unchanged. T.W.B.C.: 6,800. Lumbar puncture performed: "Fluid not under pressure. No cells. Protein—100 mgm. per 100 c.c. Globulin not increased. No reduction of Benedict's solution. No organisms seen in smear." W.R./Kahn (blood): Negative. "Seen; semiconscious, spastic, no neck stiffness. Tendon reflexes all + and equal. Discs—NAD. Provisional diagnosis—'Encephalopathy.' Treatment: Thiosulphate. Repeat lumbar puncture if there are signs of increase of pressure, or later for diagnosis. Watch for agranulocytosis." (M. Lipscomb. Colonel. Consultant Physician, X. Army.)

Evening: Becoming more comatose with stertorous breathing.

12.7.42: Condition worse and temperature rising. Pulse fast and thready. Unconscious.

1200 hours: Died. Temperature at death 110° F.

*Post-mortem* (Brain).—Macroscopic examination: Slight excess of cerebral spinal fluid, particularly noticeable over the sulci of the cerebral hemispheres. The cortical arterial system was engorged. In the grey matter of the cerebral hemisphere and basal ganglia small brownish areas were present, darker than the surrounding brain tissue and slightly translucent. They varied from  $\frac{1}{8}$  in. to  $\frac{3}{8}$  in. in diameter. Vessels in these areas were engorged and very dark. There was nothing abnormal found elsewhere in the body.

Microscopic examination: Pathological change is limited to the white matter of the brain. Thalamus, internal capsule, caudate nucleus, cerebral hemispheres and pons are most affected, in that order. All the histological appearances found in hæmorrhagic encephalitis, due to one of the pentavalent arsenicals, are present.

The vessels show patchy degeneration, occasionally actual necrosis of their endothelial lining, oedema of the Virchow-Robin space, thrombosis, hæmorrhage into the perivascular space and into the brain substance, laking of red blood corpuscles and leaking of a highly eosinophilic fluid into the white matter. Perivascular infiltration is present but nowhere marked. Advanced, patchy demyelination is the most extensive change present and forms the most marked feature of this particular case.

Cause of death: Poisoning, acute, due to neo-arseno-benzaldehyde. (J. M. Bowie. Major, I.M.S., Pathologist.)

#### Case 2.—Fusilier, aged 22.

Admitted to the Centre on 11.1.43. No previous history of venereal disease. His last exposure was on 23.11.42, as a result of which he developed a penile sore and was admitted a week later to a C.C.S. There the diagnosis of primary syphilis was made, a dark-ground examination from his sore having revealed the *Treponema pallidum*. His Kahn was + > 1. He was given three injections of arsenic at the C.C.S., the last one being given on 30.12.42. No ill-effects were recorded on his venereal case card following these three injections. On admission he still had a superficial ulceration along his frænum. There was no rash and his general health was good. At 14.30 hours on the day of his admission I gave him 0.6 gramme sulphostab (Boots—3 Aug. 40) intramuscularly and 0.2 gramme bismostab. Within five minutes of receiving the injection he developed retching and salivation which quickly passed into a comatose condition—pulse weak, fast and uncountable, and face and lips cyanosed. Despite adrenaline and coramine his breathing became more stertorous, his cyanosis increased and he died within an hour of receiving the injection.

*Post-mortem*.—"Commentary: (1) The congestive signs present are those following cardiac failure. (2) Pathological changes found are those due to a toxin or poison. (3) The degenerative changes found in the liver, kidney and heart indicate that the pathological changes found are of some duration, and could not have occurred in the hour which intervened between the administration of the drug and death. (4) The dilatation of the right ventricle is apt to occur when the myocardium is unhealthy. In this case degenerative changes were marked both macroscopically and microscopically.

"Opinion: In my opinion this patient had some idiosyncrasy to arsenic. The three previous injections had produced degenerative changes in the different viscera compatible with chronic arsenical poisoning. The sequelæ of events which followed the fourth fatal



injection would appear to have been as follows : First, a nitritoid crisis occurred. This led to shock in which a peripheral circulatory failure occurred, with dilatation of the capillaries. This caused an excessive strain on the damaged myocardium which led to dilatation and death.

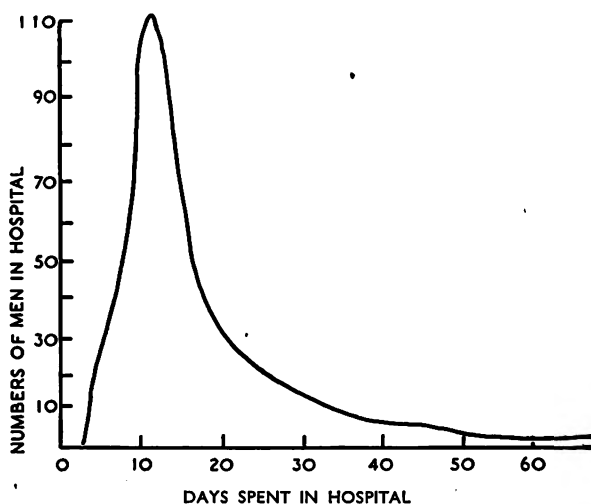
"Findings : In my opinion death was due to acute dilatation of the right ventricle in a person who had an idiosyncrasy to arsenic. Owing to this idiosyncrasy, fatty degeneration of the liver, and degeneration of the other viscera, which included myocardial degeneration, occurred." (A. Sachs. Lieut.-Col., R.A.M.C., A.D.P., Paiforce.)

#### BALANITIS.

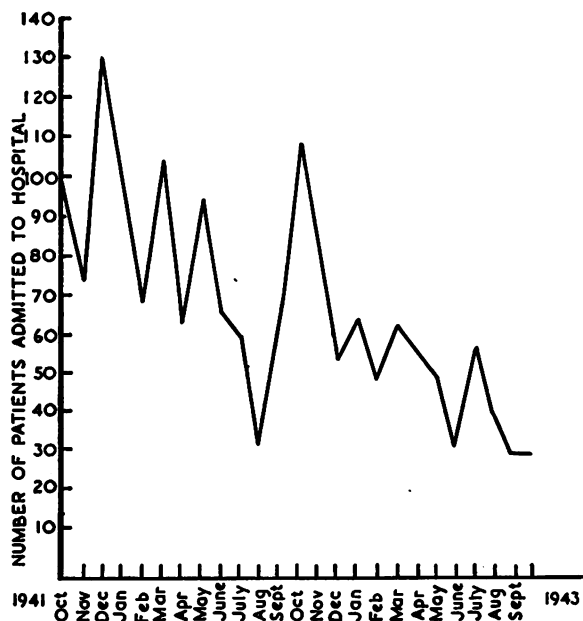
The line of demarcation between balanitis and NYD. VS. is not always an easy one to decide. The typical case of an uncomplicated balanitis, as distinct from an acutely inflamed phimotic prepuce due to a concealed ulcer, is the partially, or completely, retractable prepuce with a purulent sub-preputial discharge and very little, or no, surrounding inflammation of the preputial tissues. The pathology of the condition is an acute inflammation limited to the mucous membrane of the prepuce-balanitoid fold. Varying degrees of this inflammation are met, from a hyperæmia with a slight serous discharge, to the frankly purulent discharge. In the milder cases, having a retractable prepuce, the condition responds readily to simple hygienic measures, being frequently caused by a lack of these measures. The purulent cases respond to sub-preputial irrigations and to sulphanilamide by mouth, but are very prone to relapse. These purulent cases are frequently left with a greatly thickened mucous membrane. The only cure for these cases, once the acute stage has passed, is circumcision. And the treatment of the acute stage does not call for a dorsal slit or any other form of surgical intervention.

At times associated with balanitis is the condition of penile warts. Being without a diathermy or a cautery my lines of approach to these were reduced to three. Moist warts I painted frequently with pure carbolic. Dry warts I painted with trichloroacetic acid. Failing with either of these, and if the case was suitable, I performed a circumcision.

#### APPENDIX.



Graphical representation showing the duration of stay in hospital of the first 1,246 patients admitted to the centre suffering from venereal disease. The average duration of stay in hospital works out at 19.12 days. The maximum duration of stay was 155 days. Out of this number 63 were evacuated to Shaiba before being fit for duty.



Graph showing the monthly admissions of gonorrhœa, syphilis and NYD. VS.

Before closing I wish to pay a word of tribute to the R.A.M.C. Orderlies who worked with me—"S.T.O.s"—and a particular word for Sergeant P. C. Bushnell, R.A.M.C., whose work in the clinical side room (a tent) under very varying conditions of climate never varied. Apart from the dark-ground examinations and urethral smears which he examined for the British Section daily, he also did all the similar work for the Indian Venereal Section whose numbers were always double, and often treble, our own.

# COMMENTS ON KALA-AZAR WITH A REPORT ON THREE CASES.

By Major JOHN MACKAY-DICK, M.B., Ch.B., M.R.C.P. Edin.,  
*Royal Army Medical Corps.*

[Received March 7, 1945.]

In this war some of us have been fortunate enough to familiarize ourselves with diseases not commonly found amongst United Kingdom Service personnel. To me the most intriguing new disease has been kala-azar. I first met with visceral leishmaniasis (kala-azar) in Eritrea in 1941 just after the Imperial Forces had taken that country. In all, I saw six cases of kala-azar before I left for Syria and in each case, four of whom had reported sick with malaria, a clinical diagnosis of kala-azar was made, as it can be, before conclusive evidence was demonstrated.

As far as I am aware these were the first cases of Sudan kala-azar to be diagnosed in British troops in the Middle East in this war. The patients had all served in the Gedaref-Gallabat areas of the Anglo-Egyptian Sudan and kala-azar is endemic in these areas. At this time numerous troops, who had fought in these areas, were being rushed back to the Western Desert in an attempt to resist Rommel's progress through Cyrenaica. The consultant physician, M.E., was warned that kala-azar had started to show itself amongst British troops who had served in the Anglo-Egyptian Sudan and that their comrades were back in Egypt once again. Hospitals were warned to be on the look-out for Sudan kala-azar in cases of prolonged P.U.O. and soon kala-azar of the Sudan type was being diagnosed amongst British troops in Egypt. This emphasizes the great importance of asking every case of P.U.O. in what countries he has served and in what areas of these countries. In this way a constant *awareness* of kala-azar is maintained.

I wish to present notes on three cases of kala-azar which occurred in British other ranks who had contracted the disease whilst serving in North Africa (Tunisia, Tripolitania and Algeria).

In two cases, the diagnosis was made on clinical grounds over eighty days before the demonstration of the Leishman-Donovan bodies in one case, and the therapeutic response to stilbamidine in the other case, left no doubt about the diagnosis. In the third case kala-azar was seriously considered four months before conclusive proof had been obtained. This third case is the most interesting case of all and many invaluable lessons are to be learnt from it.

All these cases of kala-azar (Mediterranean) are similar to the cases of kala-azar of the Sudan variety seen by me in 1941 and that is why they were more or less diagnosed at sight on purely clinical grounds. For various reasons treatment was not exhibited for a long time.

Notes in each case will be as brief as possible. In all cases the following investigations were carried out repeatedly and with negative results : blood culture ; stool and urine culture ; routine stool and urine examinations ; agglutination reactions for *B. abortus* and *Br. melitensis* ; Paul Bunnell reaction ; Weil-Felix reaction ; Kahn F.T. ; X-ray chest ; screen diaphragm. No malaria parasites or *Sp. recurrentis* were found in Cases A and B.

In addition, Cases A and B received a thorough and prolonged course of treatment as for malaria. So did Case C but he had proven malaria. Captain W. R. Gauld, R.A.M.C., supervised the treatment adopted which was on the lines advised by Professor S. Adler of the Hebrew University, Jerusalem, in a personal communication to Lieutenant-Colonel T. E. Gumpert, R.A.M.C. This scheme of treatment will follow the case reports.

*Case A.—Lance-Sergeant D.F.—Aged 29. Service : 3 years.*

Admitted to a General Hospital on 25.12.43. For one week previously he had been complaining of general weakness, anorexia, nausea and a little vomiting. He finally decided to report sick and he was found to have a high temperature. On admission he was febrile, there were bronchitic signs in the chest and a slight icteric tinge in the sclerotics. At this time the edge of the spleen was just palpable and there was hepatic discomfort. However, by 19.3.44 the spleen was easily palpable three fingers breadth below the left costal margin and

the liver was a full hand's breadth below the right costal margin. At this time the earthy pallor of the skin was obvious. The behaviour of the blood-counts before and after treatment are of interest.

26.12.43: W.B.C. 2,600.

1.1.44: W.B.C. 3,000, P. 62 per cent, L. 36 per cent, M. 2 per cent.

17.1.44: W.B.C. 8,000, P. 64 per cent, L. 31 per cent, M. 4 per cent, E. 1 per cent.

1.2.44: W.B.C. 7,000.

28.2.44: W.B.C. 10,000, P. 56 per cent, L. 40 per cent, M. 8 per cent, E. 2 per cent.

19.3.44: W.B.C. 4,400, N. 64 per cent, L. 31 per cent, M. 5 per cent.

R.B.C. 3,100,000, Hb. 60 per cent.

N.B.—Fluctuation in total white blood cell count without absolute neutropenia. Also marked fall in red cell count.

*Solustibosan therapy* commenced (14.5.44, i.e. 151st day of fever). Total 120 c.c. Temporary benefit but gradual relapse.

*Stilbamidine therapy* commenced (14.6.44, i.e. 181st day of fever).

26.6.44: R.B.C. 3,900,000, Hb. 79 per cent.

W.B.C. 8,200.

1.7.44: W.B.C. 11,000, N. 73 per cent.

21.7.44: W.B.C. 11,600, N. 52 per cent, L. 36 per cent, M. 7 per cent, E. 3 per cent, myelocytes 2 per cent.

6.8.44: W.B.C. 10,000, N. 58 per cent, L. 3 per cent, M. 10 per cent, E. 2 per cent.

21.8.44: R.B.C. 4,500,000, Hb. 88 per cent.

W.B.C. 11,000.

Before he became ill his weight was in the region of 65 kilos. On the 151st day of illness when solustibosan therapy was commenced his weight was 47 kilos, while on 16.8.44 it was 61 kilos.

Other investigations carried out were:—

*Formol Gel Test*: Negative on 3.2.44, i.e. 48th day of illness.

Negative on 19.3.44, i.e. 93rd day of illness.

Negative on 14.4.44, i.e. 120th day of illness.

*Sternal puncture*: "Leishman-Donovan bodies present. Moderate increase of plasma cells."

*Icteric Index*=4 (4.2.44).

*Van den Bergh reaction*: Negative.

*Plasma proteins* (Hebrew University, Jerusalem, by courtesy of Professor S. Adler): Total proteins 5.98 per cent, albumin 3.54 per cent, globulin 2.26 per cent, euglobulin 0.18 per cent.

It will be seen that under stilbamidine therapy the patient returned to normal in all respects and when he set sail for the U.K. the liver and spleen were just about 1—2 fingers breadth below the respective costal margins.

*Case B.—Lance-Corporal R.M.—Aged 28. Service: 4 years.*

Admitted to a General Hospital on 4.2.44. For at least ten days previously he had been complaining of vague ill health, backache, occasional shivers and sweating. His friends remarked how ill he was looking and on their repeated advice he reported sick. He was found to be febrile and was observed for three days before admission to hospital. On examination he was febrile, the spleen and liver were just palpable; with the passage of time the liver became progressively enlarged to four fingers breadth below the right costal margin, but the spleen never became larger than two fingers breadth below the left costal margin. In addition, the skin gradually developed an earthy pallor, the sclerotics became icteric (icteric index was 15 on 15.3.44, 60 on 14.8.44 and almost normal by the time the patient embarked for the U.K.). The test for urobilinogen in the urine was strongly positive. There were also bronchitic signs in the lungs. The behaviour of the blood-counts before and after treatment is of interest:—

6.2.44: W.B.C. 4,600.

13.2.44: W.B.C. 3,000.

13.3.44: W.B.C. 5,000, N. 48 per cent, L. 49 per cent, M. 3 per cent.

3.4.44: R.B.C. 2,890,000, Hb. 74 per cent.

W.B.C. 4,800, N. 61 per cent, L. 27 per cent, M. 10 per cent, E. 2 per cent.

N.B.—No marked neutropenia but marked fall in red cell count.

115th Day of Illness (18.5.44) : Commenced course of solustibosan therapy. Total 120 c.c.

159th Day of Illness (28.6.44) : Commenced course of stilbamidine therapy.

11.7.44 : R.B.C. 3,160,000, Hb. 66 per cent.

W.B.C. 7,000.

21.7.44 : W.B.C. 6,900, N. 67 per cent, L. 27 per cent, M. 6 per cent.

Before the stilbamidine therapy was commenced his weight was 58 kilos and on 26.8.44 after one course of stilbamidine therapy his weight was 62 kilos.

Other investigations which were carried out were :

15.3.44 (51st day of illness) : B.S.R.=45 mm. in first hour (Westergren).

*Van den Bergh reaction* : Direct : negative.

31.3.44 : *Formol Gel Test* : Positive in thirty minutes (67th day).

3.4.44 : Plasma protein 6.8 gm. per cent, albumin 3.8 gm. per cent, globulin 3.0 gm. per cent.

*Sternal puncture* repeatedly negative.

Prior to embarking for the U.K. the patient was returning to normal in every way and his liver and spleen were very much smaller and just palpable.

*Case C.—Corporal N.G.—Aged 31. Service : 13 years.*

This patient, admitted to a General Hospital on 15.2.44, had recently served in Tunisia and Algeria in precisely the same places as Cases A and B. On admission to hospital he was found to be suffering from malaria B.T. but in spite of adequate anti-malarial therapy, carefully controlled by Tanrets Test, and including intravenous quinine therapy, fever continued and the clinical picture resembled typhoid fever except that rose spots never appeared. The patient became so ill that he was placed on the Dangerously Ill List. The illness had the following characteristics :—

(1) Essentially a continued fever lasting roughly twenty days.

(2) Slight but *persistent* splenomegaly.

(3) Liver not palpable but discomfort in hepatic region.

(4) No rash.

(5) Average pulse rate in late eighties.

(6) Leucopenia. W.B.C. 2,400, N. 68 per cent, L. 30 per cent, M. 2 per cent.

(7) B.S.R. 31 mm. in first hour (Westergren).

(8) Formol gel test negative.

He was given a therapeutic test course of emetine hydrochloride as for amoebiasis but without benefit.

He visibly lost weight and became very weak. His skin developed an earthy pallor. Gradually he improved, gained in weight and strength and on 26.4.44 was sent to a convalescent depot.

A diagnosis of kala-azar had been carefully considered but in view of the apparent cure we were driven to consider the case as being one of the enteric group fever—a diagnosis which I dislike making. When the patient went to the convalescent depot his spleen was just palpable.

He was readmitted to the general hospital from the convalescent depot on 15.6.44 complaining of "pain in his spleen," which was perfectly true as he had a gross splenic friction rub due to perisplenitis, upper abdominal discomfort and attacks of weakness and "blackouts."

*On examination.*—(1) Afebrile on first examination but subsequently found to have low grade irregular pyrexia. Maximum temperature was 99.4° F.

(2) Spleen enlarged, firm and tender and easily palpable, more than a hand's breadth below the left costal margin. Extensive and easily palpable splenic friction rub.

(3) Liver enlarged, firm and palpable at least four fingers breadth below the right costal margin.

(4) Average pulse rate in the eighties.

(5) Earthy pallor.

(6) 15.6.44 : R.B.C. 3,600,000, Hb. 65 per cent, W.B.C. 5,700, P. 56 per cent.

18.7.44 : W.B.C. 2,600, N. 64 per cent, L. 30 per cent, M. 5 per cent, E. 1 per cent.

B.S.R.=18 mm. in first hour (Westergren). No correction made for anaemia.

*Icteric Index*=4.

*Van den Bergh reaction* : Delayed ; direct.

*Formol gel test* : Positive in thirty minutes.

*Fractional test meal* : Within normal limits.

*Urine* : No excess urobilin.

*Fragility of R.B.C.* : Commences at 0.4 per cent NaCl and is complete at 0.35 per cent.

*Reticulocytes* : 0.4 per cent. No spherocytes seen.

*Blood films* and thick drops after adrenalin show no malarial parasites.

*Spleen puncture* : Leishman-Donovan bodies seen.

"Fairly numerous motile leptomonas forms seen in culture after sixty hours' growth at room temperature. The nucleus, kinetoplast and flagellum are clearly distinguishable in nearly all individuals." Following one course of treatment with stilbamidine started on 28.7.44, the spleen was scarcely palpable, the liver palpable two fingers breadth below the right costal, the patient had gained four kilos in weight, was feeling very well and making excellent progress.

31.7.44 : W.B.C. 3,600.

5.8.44 : W.B.C. 4,400.

21.8.44 : W.B.C. 4,800.

10.9.44 : R.B.C. 4,400,000, Hb. 89 per cent, W.B.C. 6,600, N. 62 per cent, L. 26 per cent, M. 8 per cent, E. 4 per cent.

The patient was fit to travel to the U.K. to complete his treatment on 10.9.44.

In the tropics and subtropics we find a diagnosis of enteric group fever frequently made in the type of clinical picture presented by this case. On first admission to the General Hospital such a diagnosis seemed reasonable, even in the absence of rose spots because these are not constantly present. However, I do believe, and this case surely supports my belief, that no case should be diagnosed as enteric group fever or undulant fever clinical, etc., until repeated and adequate investigations for evidence of visceral leishmaniasis have been carried out, e.g. smears and cultures from sternal puncture, spleen puncture and gland puncture. Furthermore, if these investigations are negative, the patient should be reviewed every six weeks for six months by a physician and a pathologist—preferably a hæmatologist—both skilled in tropical medicine. *Of course, these remarks refer to patients who have served in kala-azar areas.*

#### TREATMENT.

Specific treatment consists of the exhibition of stilbamidine (isethionate) (M & B 744) which may be given intramuscularly, when it gives rise to much discomfort, or intravenously.

Toxic reactions may be late or immediate. The former consists of the so called "diamidino-stilbene neuropathy" (Napier and Sen Gupta). Immediate reactions include burning sensations all over the body, flushing of the face and slight giddiness. These are mild whilst moderate reactions combine these symptoms with vomiting, epigastric distress, dyspnoea, feebleness of the pulse and sweating; finally, in severe reactions, the patient collapses with a steep fall in blood-pressure and loss of pulse at the wrist. Wien showed that the fall in blood-pressure can be avoided by a previous injection of calcium gluconate (*B.M.J.*, May 27, 1944, p. 724). Devine has described the toxic action of stilbamidine on the liver and kidneys in rabbits; these animals showed transient hyperglycæmia and marked nitrogen retention but death took place in hypoglycæmia. Wien, Freeman and Scotcher showed that in dogs and rabbits the serum calcium and potassium levels both fell within a few hours. Some cases of Sudan kala-azar died of signs suggesting hepatic failure (*B.M.J.*, May 27, 1944, p. 724). Nearly all of these toxic reactions can be prevented by using stilbamidine freshly made, every day, *immediately* before use, and diluted in 10 per cent glucose in sterile distilled water and given very very slowly intravenously.

In addition the following precautions should be taken :—

(1) Intravenous injections should be given one hour before the midday meal so as to prevent vomiting.

(2) A high carbohydrate, high protein, high vitamin and restricted fat diet of high calorific value should be given throughout the course of treatment.

(3) Adrenalin (1 : 1,000) min. 7½—min. 15 should be given at once should immediate reactions appear.

(4) Calcium lactate in large doses by mouth or calcium gluconate by injection should be given daily. Absorption of calcium following oral administration is not very satisfactory unless massive doses are given on an empty stomach first thing in the morning before breakfast and last thing at night. The exhibition of calcium by the parenteral route is to be preferred as its absorption is certain.

(5) Keep a close eye on the appetite. If this is good all is well but if it suddenly fails *stop specific treatment at once.*

(6) Carry out complete blood-counts at weekly intervals.

One unfortunate and very trying complication of stilbamidine noticed by me in Eritrea in 1941 was very troublesome and that was *venous thrombosis*, the result of intravenous administration of the drug. Its occurrence was lessened and finally prevented completely by using very dilute *freshly* prepared solutions of the drug and by giving the solution very very slowly.

Stilbamidine is given intravenously every day in the following doses :—

1·5 mgm. per kilo body-weight for five days.

2·25 mgm. per kilo body-weight for five days.

3·0 mgm. per kilo body-weight for fourteen days.

N.B.—We did not adhere strictly to these doses in every case. I would suggest that the drug should be dissolved in 50 to 100 c.c. of 10 per cent glucose in sterile distilled water and given as slowly as possible intravenously by using a tube and funnel or the usual apparatus for giving fluid intravenously by the continuous drip method.

Two, and possibly three, courses of treatment should be given at intervals of two to three months in the absence of signs of onset of the diamidino-stilbene neuropathy, which should be searched for diligently in every case, and following adequate liver function tests, as impaired liver function, with or without jaundice, may be evident at this time.

The patient should be weighed weekly.

*Tests of cure* should include : (1) *Spleen puncture* as long as the spleen is palpable ; (2) *gland puncture* ; (3) *sternal puncture*.

It is advisable to carry out at least two of these as it is not uncommon to find a gland puncture positive with negative splenic puncture and vice versa (Horgan, in personal communication).

In the diagnosis of Mediterranean kala-azar, and I believe in Sudan kala-azar as well, the following points are well worth bearing in mind.

(1) The not infrequent vague and insidious onset of the illness. Patients are found to be walking around with high temperature and report sick because they feel out of sorts or their friends tell them that they are not looking well or because of the appearance of some other febrile illness, commonly malaria, which does not appear to respond to adequate therapy—the reasons being that the patient also has kala-azar.

(2) *Fever* : Nearly all varieties of a prolonged continuous fever can be seen. Broadly speaking, the fever is usually continuous and prolonged but there may be an initial febrile illness which simulates enteric group fever very closely and a later recrudescence of fever may suggest a relapse of enteric group fever.

In the usual type of case there is prolonged fever with profuse sweats in the morning but without joint pains or orchitis, etc.

Too much stress is laid on the double rise of temperature in the twenty-four hours. Like all rarities it gains a prominent place in the minds of many—the inexperienced many.

(3) *Splenomegaly* : This is constantly present and is usually slowly progressive and fairly marked but sometimes the spleen is just palpably enlarged and no more. It is said that the spleen reaches the costal margin in two months and then enlarges by one F.B. every month but that is not necessarily so. *Perisplenitis* may occur (Case C).

(4) *Hepatomegaly* : This is also constantly present. It is also slowly progressive. It may be marked but it is usually moderate and frequently the liver is just palpably enlarged.

(5) *Lymphoglandular* enlargement is not obvious but this should not prevent gland puncture being carried out.

(6) Blood Changes : R.B.C.s usually fall to 3 or 4 million or even less. *A leucopenia takes some time to develop* but its appearance is inevitable and progressive with the passage of time in *untreated cases*. In the three cases here described the fall in the red cell count is most striking.

(7) *Formol Gel Test* : This test, much lauded in India, is really useless as a diagnostic test. It is a long time before it becomes rapidly positive, and that is when it is of significance.

(8) *Jaundice* may be present and may become slowly progressively worse in the untreated patient.

(9) Appearance of an *earthy pallor* of the patient is very frequent but may be missed because of its gradual appearance. It is more noticeable to the second opinion than to the Medical Officer in charge of the case.

(10) *Appetite* is frequently remarkably good in spite of long febrile illness with associated profound and progressive lassitude and lack of energy.

(11) *Dysenteric* symptoms may occur and Leishman-Donovan bodies may be found in the mucus.

(12) *Hæmaturia* when it occurs is of ill omen.

(13) *Bronchitis* may be marked.

(14) With proper technique Leishman-Donovan bodies should be found in spleen puncture, sternal puncture or gland puncture. The parasite is not difficult to culture if correct technique is used.

(15) Cutaneous leishmaniasis may be present and should be searched for diligently in all cases.

(16) It is not uncommon for the patient to be admitted to hospital for some other disease process, e.g. malaria, and when this does not appear to respond to adequate therapy it is only then that this oftentimes insidious disease is suspected.

#### CONCLUSIONS.

(1) Three cases of kala-azar are presented.

(2) In each case a diagnosis was made on clinical grounds months before proof positive was obtained that the patients were suffering from kala-azar.

(3) Each patient was from a different unit so there is every reason to believe that there must be similar cases from these units wherever they may be.

(4) Kala-azar is a chronic disease which may exhibit exacerbations which vary in severity from mild, just necessitating avoidance of over-exertion, to very severe, necessitating the patient's name being placed on the Dangerously Ill List.

(5) In kala-azar spontaneous remissions may occur with inevitable relapse.

(6) In the diagnosis of cases of P.U.O. it is of vital importance to know in which countries the patient has served, to familiarize oneself with the main diseases of these localities and to keep in mind the possibility of kala-azar where there is persistent splenomegaly with or without associated hepatomegaly.

(7) A diagnosis of enteric group fever in the case of individuals who have served in areas where kala-azar occurs should only be made after kala-azar has been excluded beyond all shadow of doubt, especially in cases with persistent splenomegaly however mild that might be.

(8) In adequately investigated cases it is not difficult for an experienced physician to make a presumptive diagnosis of kala-azar on clinical grounds alone.

(9) In the diagnosis of kala-azar sternal puncture should be carried out and repeated as necessary. Smears and cultures should be made. Gland punctures should also be performed. If all these procedures are attended with negative results then spleen puncture is indicated.

(10) An adequate therapeutic test course of stilbamidine should be given as a life-saving measure in suspected cases of visceral leishmaniasis when repeated investigations have failed to demonstrate the presence of Leishman-Donovan bodies and cultures have been carried out with negative results.



(11) Stilbamidine is curative in cases of Mediterranean kala-azar which is very reminiscent of the Sudan variety of kala-azar.

(12) The only disadvantage of stilbamidine if freshly prepared solutions are used, and given with care, is venous thrombosis. It is felt that the incidence of this can be reduced by marked dilution in 10 per cent glucose in distilled water and by very slow administration of the drug intravenously.

(13) Leucopenia, when present in kala-azar, is due to the presence of that disease and is cured by stilbamidine which should be exhibited at once no matter the severity of the initial degree of leucopenia. It is doubtful if it is necessary to give pentose nucleotide at the same time.

(14) Newcomers to the tropics and subtropics would be well advised to bear in mind the fact that kala-azar is more common in areas where kala-azar is endemic than are acholuric jaundice, lymphadenoma, aleukæmic leukæmia, certain types of malignant neoplasm and infective endocarditis, etc., and that a leucopenia associated with progressive splenomegaly with or without obvious hepatomegaly, in a febrile patient, is more common in kala-azar than in septicæmia, liver abscess or deep-seated cryptic osteomyelitis.

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7361460 Serjeant A. J. Smith, *R.A.M.C.*, for typing these notes for me.

[It has, unfortunately, not been possible to print the temperature charts sent with this paper.

*Case A.*—Admitted on December 25, 1943, with a temperature of 104° F., this patient remained febrile until June 22, 1944, and did not finally settle until July.

*Case B.*—Admitted on February 4, 1944, with an initial temperature of 99° F., showed a temperature swinging from 103° F. to 104° F. until May. With the administration of solustibosan it fell to nearly normal but ten days after the completion of the course was again rising. During the course of stilbamidine then commenced, it rose each evening to about 103° F., to fall to normal at the conclusion of this course.

*Case C.*—This case showed a temperature round about 102° F. for about a month—February 15 to March 19, 1944. The next appreciable rise was to 101° F. on July 23, when a mildly irregular fever continued until after the third dose of stilbamidine started on August 12. There was no further rise after August 20.

These charts show very graphically the protracted fever associated with the condition described. A great deal of time and trouble was expended on their preparation for reproduction and we regret that it was not possible to print them. However, the excellent clinical description given in the text leaves the reader in little doubt as to the chronicity of untreated kala-azar.

Readers will find the article on kala-azar in the Memorandum on Tropical Diseases in Tropical and Subtropical Areas of much interest if read in conjunction with Major Mackay-Dick's article.—EDITOR.]

## THE TREATMENT OF RELAPSING MALARIA.

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MALARIA produced more casualties than any other disease in the 14th Army. In its acute form it may be a danger to life, but it is of chief importance as an economic factor. The drain on man-power of the continually relapsing case is a more serious problem than the occasional death from cerebral malaria. It is all too common to find men who have an attack regularly once a month and who either return to their units for only a few days between attacks, or who become involved in a seemingly endless progression from hospital to convalescent depot and back again.

Napier (1943) considers that chronic relapsing malaria is usually simply malaria that has been inadequately treated. He admits that "even after a full course of cinchona the relapse rate in benign tertian is high and the treatment may have to be repeated for two, three or even more relapses." This appears to be an optimistic view as far as British troops in 14th Army are concerned. Even after the certain administration of six or seven full courses of treatment nearly two-thirds continue to relapse.

The relapse rate over a period of eleven weeks in a series of British patients already known to be relapsing was 64·7 per cent. The reluctance of standard textbooks to commit themselves to a definite figure when discussing relapse rates is understandable when the difficulty of excluding reinfection is appreciated. Figures are only comparable for similar types of case over the same period of follow-up. The relapse rate in this series corresponds closely to Sinton's (1930) findings and to Napier and Chaudhuri's (1941) estimate, though the latter do not state the period of time to which their figure refers.

The results of a fruitless attempt to improve the position are recorded here in the hope that it will stimulate further work on this problem at a time when the opportunity for the controlled study of malaria is unique.

### DISCUSSION.

It is now generally agreed that relapses are due less to the existence of special resistant sexual forms than to the failure of the body to restrict the multiplication of parasites to negligible proportions (Stitt, 1942, quoting Ross and Bignami). It is probable that residual parasites are lodged in the organs and tissues of the body, especially the spleen and bone-marrow (Stitt, 1942, quoting Bass).

Claims have been made (Raffaele, 1937) that there is a reproductive cycle actually occurring in the endothelial cells of the bone-marrow in man corresponding to the exo-erythrocytic schizogony established in avian malaria (Huff and Bloom, 1935), but these claims have not been substantiated.

Africa and Dy (1942), speculating on the possibility of exo-erythrocytic forms in man, express the hope that a drug may be found that will attack parasites in the reticulo-endothelial system. This appears to be the crux of the matter. The standard course of antimalarial treatment in use in the Army in India (consisting of quinine grains 10 t.d.s. on Days 1 and 2, mepacrine 0·1 gramme t.d.s. on Days 3 to 7, and pamaquin 0·01 gramme t.d.s. for British troops and b.d. for Indian troops on Days 10 to 14) is adequate in controlling the febrile phase of malaria; but it is not effective in preventing relapses. The majority of drugs used so far in the treatment of malaria have little or no effect on the parasites in the fixed tissues (Fonde and Fonde, 1939). It is with the hope that they might act on the reticulo-endothelial phase of malaria that the sulphonamide group of drugs have been exhibited (Clark, 1941)

without marked success. The organic arsenicals have been used with widely differing results, but there is no convincing evidence that they are of any value in preventing relapses, though they are capable of controlling the febrile phase of the attack (Lowe, 1943).

Kala-azar chiefly affects the reticulo-endothelial system; the causative protozoon, *Leishmania donovani*, is readily recovered by sternal or spleen puncture, but it is exceedingly rare to isolate it from the peripheral blood; the infection responds well to urea stibamine. Analogy from the known behaviour of this protozoal disease leads by a somewhat slender thread of argument to the suggestion that urea stibamine may destroy malarial parasites in the fixed tissues.

This suggestion received clinical support when two cases of "kala-azar" were transferred to the hospital at which this work was begun. In these cases treatment had already been started though the diagnosis had not been confirmed by the demonstration of Leishman-Donovan bodies. Both of them were also suffering from relapsing malaria, and it was observed that they failed to relapse again while the prolonged course of treatment with urea stibamine was being completed.

It was then resolved to give urea stibamine a trial in the treatment of relapsing malaria. A search of the literature revealed no mention of its previous use, though deNunno (1935 and 1940) had exhibited antimony and potassium tartrate orally in Abyssinia.

It was clear that such a trial must be carried out in a non-malarious area in order to exclude the possibility of reinfection. Follow-up is valueless if cases are allowed to re-enter a malarious area for however short a time. If an adjacent convalescent depot is not available, it means that only a comparatively short follow-up is possible on account of pressure on hospital beds.

EXPERIMENT 1.—This was carried out on Indian Other Ranks in an Indian General Hospital situated in a non-malarious station between May and September, 1943. The surrounding area was malarious and consequently cases had to be followed up actually in the hospital, and this could only be done for five weeks; to compensate for the short follow-up, steps were taken to provoke a relapse within this period by controlled exercise and exposure to cold.

Since the history obtained from Indian Other Ranks is notoriously unreliable, cases were only used who had been admitted to the hospital with one attack of malaria and who had relapsed before their discharge. No case was accepted unless the clinical manifestations of malaria had been confirmed by positive thin blood films. Cases were taken alternately into Group C (Control) and Group E (Experimental).

Both groups received standard antimalarial treatment on Days 1 to 14 with iron tonic on Days 8 to 14. In no case was the malarial attack sufficiently severe to demand reinforcement of standard treatment by intravenous quinine or intramuscular mepacrine.

Group C were retained in hospital from Day 15 to Day 21 without further treatment, while Group E received injections of urea stibamine on Days 15, 17, 19 and 21. Dosage was :—

Day 15 .. .. .	0.025	gram.	} Total 0.325 gram.
Day 17 .. .. .	0.05	gram.	
Day 19 .. .. .	0.10	gram.	
Day 21 .. .. .	0.15	gram.	

On Day 22 attempts were made by standard methods to provoke relapse in both groups at a joint parade: (i) By a standard fatigue of unloading hospital rations; (ii) by running and walking under observation for half a mile around a field adjacent to the ward, followed by (iii) a cold bath.

Such provocative exercise was found to be easily controlled in comparison with digging, P.T. or other fatigues, and was continued daily until Day 35 or until a relapse occurred.

The importance of excluding the co-existence of kala-azar in these cases is clear. Sternal and spleen puncture was done on every case which presented any clinical suspicion of leishmaniasis. One such case proved positive and was rejected from the series.

98 cases were dealt with before the experiment had to be wound up, 48 experimental and 50 controls; the discrepancy in figures is due to patients who absconded, possibly as a result of the unexpected exhibition of a needle.

A relapse was defined as the association of the clinical signs of malaria with a positive blood slide. There were seventeen relapses in Group C, equivalent to 34 per cent, and three relapses in Group E, equivalent to 6.25 per cent. There were no "clinical" relapses with negative slides in either group.

The standard error of the difference between these two percentages is 7.56, and the observed difference is 27.25, which being more than three times the standard error is significant.

EXPERIMENT 2.—This was carried out between April and September, 1944, at a British Military Hospital situated in a non-malarious station in which Convalescent Depots were available both for Army and R.A.F. personnel. No fresh infections of malaria are known to have been acquired at any time at any of the units at which the men were observed. Cases were all British Other Ranks.

Since a prolonged follow-up was contemplated, it was not considered justifiable to investigate every man with a single relapse on account of the wastage in man-weeks such a procedure would have entailed. Cases were selected who gave a history of at least three attacks of malaria in the last four months, all diagnosed by positive blood slides, and for which full standard treatment had been received on each occasion. No case was selected unless he had been in the station at least a fortnight before the most recent attack. This precaution provided proof of relapse though the pattern of the previous illnesses gave a clear pointer that the attacks were in fact relapses and not repeated reinfections. No case was accepted unless the clinical manifestations of malaria had been confirmed by positive blood examination. Diagnosis was made from the examination of thick drops. It is appreciated that no more than a good guess at the morphological type of parasite can be made by this technique; it was unfortunate that the time-consuming thin film could not be examined in every case, since the whole experiment was carried out during a period when the routine work of the hospital demanded a great part of the investigator's attention.

104 consecutive cases fulfilling the above conditions were investigated and followed up for eleven weeks from the onset of the last attack or until they relapsed again.

Cases were taken alternately into Group C (Control) and Group E (Experimental). Both groups received standard anti-malarial treatment on Days 1 to 14 with iron tonic on Days 8 to 14. In no case was the malarial attack sufficiently severe to demand reinforcement with intravenous quinine or intramuscular mepacrine. Group C were retained in hospital from Day 15 to Day 21 while Group E received injections of urea stibamine on Days 15, 17, 19 and 21. Dosage was:—

Day 15 .. .. .	0.05 grm.	} Total 0.50 grm.
Day 17 .. .. .	0.10 grm.	
Day 19 .. .. .	0.15 grm.	
Day 21 .. .. .	0.20 grm.	

On Day 22 all cases were discharged to the appropriate Convalescent Depot. No specially controlled provocative exercise was used; cases were allowed to pursue their normal course at the Convalescent Depot, moving up gradually from Grade III (which involves simple exercises for feet and arms and up to two miles cross-country march) to Grade I (consisting of strenuous P.T., heavy fatigues and up to ten mile marches). No case received any suppressive antimalarial treatment during convalescence. Cases were followed either until they relapsed and were readmitted to hospital or until they had completed eight weeks at the Convalescent Depot (i.e. until Day 77).

#### ANALYSIS OF RESULTS.

(i) A total of 104 cases were observed, 52 in Group C and 52 in Group E. Of Group C 1 was lost during follow-up, leaving 51 effective cases. In Group E 2 were lost during follow-up, 1 relapsed before injections were complete, and 2 did not receive a full course of urea stibamine on account of alarming reactions; thus there are 47 effective cases in the Experimental Group (Table 1).

TABLE 1.

	Completed	Lost	Injections incomplete	Total
C .. .. .	51	1	—	52
E .. .. .	47	2	3	52
				104

(ii) Both B.T. and M.T. relapsing cases were observed. The distribution of the predominant morphological types causing previous relapses in the two Groups is as shown in Table 2.

TABLE 2.

	B.T.	M.T.	Mixed*	Total
C .. ..	29	2	20	51
E .. ..	28	2	17	47

\* Does not indicate that both types of parasite were demonstrated in the blood at the same time, but that there was a history such as that of Private S. D. who had malaria B.T. in February, 1944, B.T. in April, 1944, M.T. in May, 1944, B.T. in June, 1944, and M.T. in July, 1944.

Thus the type of infecting plasmodium does not make Group E less likely to relapse than Group C.

(iii) The average number of attacks previously endured by each man in Group C was 5.3, and that in Group E was 4.9. Working on the assumption that, in a relapsing case, the probability of further relapse varies in inverse proportion to the number of attacks already suffered, Group E is a little more likely to relapse than Group C.

(iv) The average age of Group C was 25.8 years, and that of Group E 26.5 years.

(v) Relapses occurred during the period of observation as follows :—

In Group C the total number of relapses was 33 ; of these, 19 occurred before Day 36 and 14 between Days 36 and 77.

In Group E the total number of relapses was 28 ; 14 occurred before Day 36 and 14 between Days 36 and 77.

In addition, a small number of cases was observed for a further fortnight owing to delay in disposal from the Convalescent Depot for one reason or another. These provided 3 more relapses in Group C and 5 more in Group E (Table 3).

TABLE 3.

	Before Day 36	Between Days 36 & 77	Total	Between Days 78 & 91
C .. ..	19	14	33	3
E .. ..	14	14	28	5

Thus the relapse rate in these cases in eleven weeks from the start of antimalarial treatment is :—

Group C .. ..	64.7 per cent
Group E .. ..	62.6 per cent

If the cases observed to relapse between Days 78 and 91 are included, the relapse rates become :—

Group C .. ..	70.6 per cent
Group E .. ..	70.2 per cent

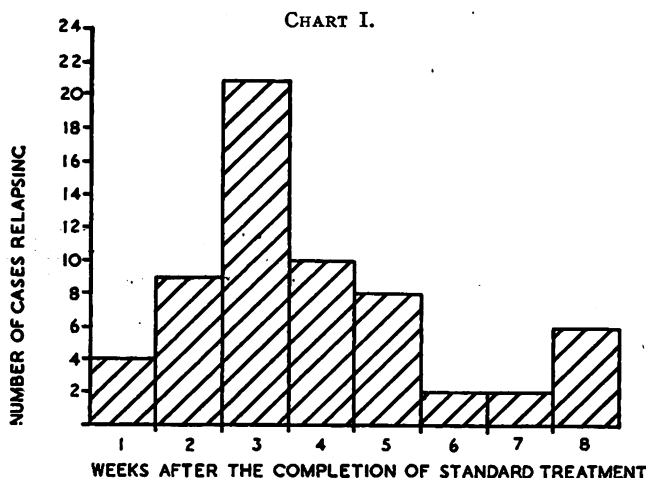
(vi) The average number of days between the start of antimalarial treatment and the day of the relapse was :—

Group C .. ..	39.5 days
Group E .. ..	38.4 days.

The highest incidence of relapse occurred in the third week after treatment for the previous attack had been completed (Chart I).

This is considerably earlier than the time suggested by James, Nicol and Shute (1936) whose maximum number of relapses occurred during the seventh week after recovery from the previous attack.

(vii) The clinical impression was formed that the severity of the relapse, while varying widely from case to case, did not differ in the main in the two groups.



#### REACTIONS TO THE DRUG.

There were many more unpleasant reactions than were observed in the previous experiment involving Indian Other Ranks (this produced only one case of mild collapse and dyspnoea after the fourth injection).

The majority were trivial and two were severe.

(i) Both severe reactions occurred with the same batch of urea stibamine, but several other patients received injections from this batch without untoward event, which suggests that they were due to idiosyncrasy to the drug.

(a) The first occurred after the second injection in a Fusilier, aged 25, with ten previous attacks of malaria; there had been no reaction to the first injection.

Five minutes after receiving urea stibamine he vomited and complained of aching pains all over the body. His colour was poor and the pulse rapid and thin. Giant urticaria rapidly developed, involving first the upper lip, then the lower lip and the soft tissues of the neck below the angle of the jaw and in the submental region. The tongue became swollen and there was difficulty in swallowing.

Subcutaneous injection of adrenaline hydrochloride 1/1,000, minims 10·0, restored the pulse volume, but the urticaria did not disappear for four hours despite repetition of the adrenaline.

(b) The second occurred in an R.A.F. Corporal, aged 22, who had had five attacks of malaria in four months. Five minutes after the second injection he complained of nausea and difficulty in breathing. He was collapsed and had obvious expiratory distress; the radial pulse was not palpable. He overbreathed to such an extent that he developed classical tetany of both hands which became fixed in the position of "main d'accoucheur." There was an audible expiratory wheeze on auscultation of the chest.

In this case also there was good response to adrenaline, which relieved the dyspnoea and improved the pulse volume. There was persistent nausea, anorexia and "shakiness" for two days.

Neither of these cases was given any more urea stibamine.

(ii) Minor reactions consisted of :—

Nausea ..	..	..	..	..	..	4 cases
Headache ..	..	..	..	..	..	2 cases
*Fever ..	..	..	..	..	..	2 cases
Urticaria ..	..	..	..	..	..	2 cases
†Collapse ..	..	..	..	..	..	2 cases
‡Aphonia ..	..	..	..	..	..	2 cases
Anorexia ..	..	..	..	..	..	1 case
Tingling of gums ..	..	..	..	..	..	1 case

\* Up to 100° with negative blood slides.

† Pale, sweating, thin pulse, much less severe than the reactions noted in (i) above.

‡ Transient, lasting for fifteen minutes. It occurred in two cases widely separated in time, and there is no question of the second reaction having been suggested by the first.

## DISCUSSION OF RESULTS.

It will be well to recall here that the relapse rate up to Day 35 in Experiment 1 was 34 per cent in Group C and 6.25 per cent in Group E. The corresponding figures in Experiment 2 would be 37.3 per cent in Group C and 28.6 per cent in Group E.

The standard error of the difference in relapse rates in the two control groups is 9.53, and the observed difference of 3.3 is insignificant. This suggests that the Indians were as liable to relapse within five weeks as the British.

The standard error of the difference in relapse rates in the two experimental groups is 7.46, and the significant observed difference of 22.35 demands explanation.

With the follow-up of eleven weeks the relapse rate in Experiment 2 was 64.7 per cent for Group C and 62.6 per cent for Group E. The standard error of the difference between these proportions is 9.73. The observed difference of 2.1 is thus quite insignificant.

While these figures show that urea stibamine had no material influence on the relapse rate in British troops, the apparent beneficial effect on Indian troops has to be accounted for.

The second experiment differs from the first in two respects: (i) The test was made on British instead of Indian troops; (ii) the follow-up was six weeks longer.

There are two possible explanations of the wide divergence in results obtained:—

(i) That subclinical infection with *Leishmania donovani* is common in Indians and helps to maintain a concurrent malarial infection.

(ii) That, had it been possible to follow up the Indians longer, the relapse rates in control and experimental groups would have more nearly approximated.

The latter supposition is the more plausible of the two and is supported by the finding that 46 per cent of the relapses in the second experiment occurred after the thirty-fifth day from the beginning of the previous relapse, and by the fact that the average number of days between the last two relapses was thirty-nine, i.e. longer than the cases in the first experiment were followed up.

No figures are available as to the time at which Indians are most likely to relapse, but it is felt that the encouraging results of urea stibamine therapy in the first five weeks would not have been sustained over a longer period.

## CONCLUSION.

It must be concluded that urea stibamine is of no practical value in the treatment of relapsing malaria. It is possible that a prolonged course such as is used for the treatment of kala-azar might be effective, but it is clear that, even if it was, it would be of negligible value in saving man-power.

It is maintained that the only hopeful approach to the problem of relapsing malaria is to search for a substance which is capable of eradicating the parasites lying dormant in the reticulo-endothelial system between clinical attacks. The unpleasant side-effects of stilbamidine argue against its trial on a large scale and deep X-ray therapy is impracticable in wartime.

## SUMMARY.

- (1) The problem of relapsing malaria in 14th Army is stated.
- (2) Views on the pathogenesis of relapse are considered.
- (3) An account of the failure of urea stibamine to influence the course of relapsing malaria is given.

## REFERENCES.

- AFRICA, C. A., and DY, F. J. (1942). *J. Trop. Med. and Hyg.*, **45**, 2.  
 CLARK, H. C. (1941). *Southern Med. J.*, **34**, 703.  
 DENUNNO, R. (1935). *Riforma Med.*, **51**, 108.  
 Idem (1940). *Stud. sassaresi*, **18**, 130.  
 FONDE, G. H., and FONDE, H. C. (1939). *Arch. Int. Med.*, **64**, 1156.  
 HUFF, C., and BLOOM, W. (1935). *J. Infect. Dis.*, **57**, 314.  
 JAMES, S. P., NICOL, W. D., and SHUTE, P. G. (1936). *Proc. Roy. Soc. Med.*, **29**, 879.  
 LOWE, J. (1943). "Personal Communication."  
 NAPIER, L. E. (1943). "The Principles and Practice of Tropical Medicine," Thacker, Spink, Calcutta.  
 NAPIER, L. E., and CHAUDHURI, R. N. (1941). *Ind. Med. Gaz.*, **76**, 335.  
 RAFFAELE, G. (1937). *Rev. Malariol.*, **18**, 73.  
 SINTON, J. A. (1930). "Records of Malaria Survey of India," **1**, 429.  
 STITT, E. R. (1942). "Tropical Diseases," Lewis, London.

## FIELD SURGERY IN THE JUNGLE (KALADAN RIVER, ARAKAN, BURMA, 1944).

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THIS paper is a record of the way in which the Medical Services were adapted to meet the demands of jungle warfare in circumstances probably not previously encountered.

A division of West African troops was instructed to make a Jeep track across the Arakan Hills, from the coast to the Kaladan River, where they were to conduct operations.

The country over which we moved has its own peculiar characteristics. Along the lower Kaladan River, the lower Pi Chaung and, in the Kalapanzin valley, are large areas of paddy field; all the rest of the territory is hill tract. The Arakan Hills are never high, few are over 3,000 ft. They are steep, sandy, ridges and peaks packed together as tightly as nature could compress them and divided by narrow deep valleys. Hills and valleys alike are covered by dense mixed jungle, mainly bamboo, the bamboo being as thick as stalks in a cornfield. Everywhere the monsoon torrents have cut deep, vertical, sinuous channels or chaungs through the sandy soil, some as small as ditches, others the size of large rivers. The native hill "paths" were paths in name only, climbing up hills with footholds cut into the steep hillside, along ridges scarce wide enough to give foot room or through chaungs filled with boulders, or interrupted by pools thigh deep in mud. They were hard going, yet it was through country often like this the African stretcher bearers carried their patients. There are, of course, no roads and, except in the areas of paddy cultivation, hardly any people. For transportation we were limited to what could be carried on the heads of the Africans. Auxiliary groups of unarmed carriers and pioneers came with us and each man was able to carry a headload of forty pounds.

COMMUNICATION.—The operational zone was so extensive, so mountainous, and so thickly covered with bamboo that it was impossible to keep the rear free from enemy troops; many were by-passed. Infiltration by the enemy, with small or large bodies, was easy and it was soon apparent that no collection of wounded could be held or moved without strong protection. One C.C.S. was destroyed and the other evacuated, so that the Field Ambulances, and the R.M.O.s became responsible for all treatment of casualties. As casualties were assembled they had to be carried forwards by stretcher bearers, until the military position and the nature of the ground allowed an air strip to be built. One could never be sure when the wounded would be cleared; often they had to be carried for a week or more. Sometimes it was only possible to build a small "strip," suitable for Moths, which only took one case each trip; as there were not many of these 'planes, casualty clearance was an anxious and tedious business, but on occasion it was possible to make a large "strip" and big transport 'planes could clear the sick twenty or thirty at a time. This delay and uncertainty in evacuation had a considerable effect upon the nature of the surgical treatment called for. Many casualties occurred whilst the men were on patrol. If a wounded man was not too far removed from his Headquarters or, if he were a stretcher case, he could be sent back with an accompanying guard; otherwise he might have to await surgical treatment until the patrol returned. The battalions were operating on a wide front; rearward evacuation to the M.D.S. would have caused delay and would need a considerable number of troops employed in giving protection.

MEDICAL ARRANGEMENTS.—The Field Ambulance consisted of three companies and Headquarters. Normally the Headquarters would set up a M.D.S. where essential treatment



could be given and a company would be attached to each operating battalion, where it would form an A.D.S. It was decided to make a Jungle Surgical Team, fully mobile, which would

(1) Have the minimum personnel able to set up and operate a theatre, with carriers for its loads.

(2) Take with it all the surgical equipment, with a limited supply of drugs and dressings.

(3) Attach itself to an A.D.S. which would supply an anæsthetist, a stretcher to serve as an operating table, and be responsible for the after-care of the patients, the replenishing of drugs and dressings and the rationing of the team.

(4) The team would consist of a surgeon, a sergeant assistant, four nursing orderlies, two servants and eight carriers.

The personal baggage of each European was restricted to twenty pounds and the surgical load to two hundred and forty pounds. Instruments, drugs, dressings, schimmelbusch steriliser, splints and plaster, transfusion sets, pots and pans, ground sheets and blankets were packed into six forty-pound loads by the four nursing orderlies who deserve mention by name. They were Agbewodie, Aboadgye, Awusavi, and Gellie.

**THEATRE SET UP.**—Arriving at the A.D.S. under the direction of Agbewodie a theatre would be built at the chosen site in the A.D.S. Two pairs of forked sticks were stuck in the ground, each supporting a crossbar, and on this a stretcher would be laid for an operating table. Two bamboo or brushwood tables to hold instruments and dressings would be made by the carriers, whilst others collected firewood and water in empty ration tins. Within an hour and a half the instruments were boiled, anæsthetics and dressings laid out, and the first case "On the table." Later, a thatch would be added over the "table" to give cover from the sun. At times, when there was a great deal of movement, as many as three of these "Theatres" were built in four days, but if it appeared likely that we would be stationary for a week or longer a more elaborate affair was constructed. Usually a dry chaung or a hillside was chosen in which a room was dug out, deep enough to give protection from mortar or artillery fire and thatched with grass or bamboo leaves. In the walls of the room recesses were dug to act as tables for instruments and dressings. These were lined with a blanket, to prevent the earth dropping in, a jaconet cloth spread over the base and a sterile towel placed upon it in the usual way. This took one to two days to build but it was worth it to feel secure, even when the noise of battle was some distance away. It was not practicable to operate at night. Lights and fires were forbidden after sundown. The only means of sterilizing was with a small schimmelbusch sterilizer, heated over a fire of wood; the theatre could be blacked out with blankets but the poverty of illumination, the heat in the confined space and the difficulties of movement without breaking the blackout made night work too difficult to be worth while.

The water supply when it came from the streams was good, fit in an emergency to be used for the making of intravenous salines but, in the paddy, the tanks and pools usually contained liquid mud; cloth filtration made no improvement but it partially sedimentated after boiling. This water, which normally would not be used for the meanest purpose, served to make up lotions, to use in the sterilizer, and from it prodigious quantities of tea were made. In the hills at times there were cholera outbreaks, but it was difficult to believe that the epidemics could be waterborne; the country was very sparsely populated and the streams crystal clear and water hygiene good. Most probably it was spread by flies. These pests abounded in the secondary scrub, they even travelled with us on the packs and headloads and refused to be dislodged. When camp was made, they bred at an alarming rate, invading everywhere; the theatre was always a favoured place and one man was detailed to chase them during operations.

The hospital at the A.D.S. was as primitive as the theatre. Litters of bamboo supported on forked sticks served as beds and a slit trench was provided alongside; the only cover from the sun was the shade that the jungle provided. Little nursing could be given and little comfort provided, although the patients were always most appreciative of what was done.

**MOVEMENT.**—Everybody engaged in this campaign was constantly on the move. Casualties usually had a difficult stretcher journey to the R.M.O. and A.D.S. The A.D.S. was constantly packing to move with the troops; the patients had to be carried with them until an air strip was provided. On several occasions over two hundred casualties were collected. If the theatre had packed up when wounded were brought in, they had to wait until the move was completed before surgical attention could be given. Little nursing could be done on the way. The following case is illustrative of the effect that movement had on treatment.

An African was brought to the A.D.S. twenty hours after being wounded. He had a penetrating G.S.W. of the abdomen; there was no air evacuation available and he had to be operated upon. After resuscitation, two large tears of the ileum were sewn up and the remains of an Ascaris removed from the peritoneal cavity. During the ensuing twenty-four hours there were so many casualties that scant attention could be given to him. The next evening he was carried to a newly made air-strip, six miles away over rough country, to be ready for evacuation early the next morning. On arrival it was found that protection could not be given against the enemy patrols that were operating so he was brought back over the same six miles. The journey was more successfully repeated the next morning, and he reached a Base Hospital five days after being wounded. It is a tribute to the African constitution to report that by the time he emplaned he was drinking copiously and demanding food.

Evacuation to a Base Hospital was preferable to jungle treatment; but the uncertainty of air evacuation soon convinced one that, if treatment was to be given quickly, it had to be done by the Jungle Team in spite of all its limitations. On one occasion this was not done, and the result was almost fatal.

An officer with a compound comminuted fracture of the humerus, badly shocked, was carried to the A.D.S. over a long and difficult stretch of country. He arrived seventeen hours after being wounded. He responded a little to resuscitation, but operation was delayed since a 'plane was expected to land at a newly completed air strip. It did not come until two days later, during which time the operation was postponed repeatedly, and he had received two further wounds in the thighs caused by the enemy mortaring the A.D.S. By this time he was too ill for treatment. He was eventually evacuated, his arm amputated, and his life saved.

**MONSOON CONDITIONS.**—Enough of the rains were experienced to realize that the method of setting up a theatre in the dry season would not then work. A theatre, on one occasion, had been made on the reverse side of a hill on raised ground. A large tarpaulin was firmly secured to cover the operating stretcher and instrument tables. A soldier wounded by mortar fire was brought in six hours after he had received his injury. Amongst others there were two tiny penetrating wounds of the abdomen which appeared to have penetrated the ascending colon. He was prepared for operation, a continuous drip plasma started, and he was anæsthetized. At the moment when we were about to begin operating the sky became black and the rain torrential. The wind, violent and gusty, blew rain all over the patient; everybody was shivering. Moreover, it lifted leeches from the paddy and deposited one on the bared chest of the anæsthetist! Darkness, cold and leeches were too strong an opposition so the operation was abandoned. He reached a C.C.S. within forty-eight hours, was operated upon and two perforations found. I believe that he survived.

The material from which this report is compiled is obtained from eighty-five serious cases of which a personal record was kept; unfortunately it was not found possible to record them all and no record could be made of a large number of the less seriously wounded.

**THEATRE TECHNIQUE** was dictated by transport restrictions but certain elementary principles were kept in mind. Effort was made to avoid wound contamination. The skin around the wounds was washed and shaved, skin towels of pocket handkerchief size were used, digital contact either with the wound or with the working ends of the instruments carefully avoided. After gaining a little experience the four African nursing orderlies became as skin conscious as the most particular orthopædic surgeon. Gloves were used, whilst they were available, since they could be sterilized in stronger lysol and scrubbed more vigorously than

hands could be. They were boiled only in exceptional cases, but climatic heat and humidity spoilt them and they could not be replaced. The shimmelbusch sterilizer consists of an oblong box, about two feet by one foot, in which instruments are boiled, inside which can be tightly fitted another box about ten inches high. This receptacle holds two dressing drums with the usual perforated ends. If a good fire is burning a strong current of steam saturates the dressing boxes, and dry "sterile" swabs and towels can be obtained. The antiseptics carried were lysolates (used for gloves and bowls) and flavine. All water used was heavily chlorinated. Sulphonamide was introduced into all wounds as a cream surface covering, and given by mouth. Lastly, every effort was made to conserve limbs. No lower limb was amputated and only one upper limb removed.

The sites at which injuries occurred are shown below.

Thigh	Calf	Arm	Forearm	Face	Head		Chest		Abdomen		Other Sites	Burns	Multiple injuries
					P.	N.P.	P.	N.P.	P.	N.P.			
17	12	17	9	2	—	: 5	5	: 3	5	: 1	24	2	21
20%	14%	20%	11%	2%	—	: 6%	6%	: 3½%	6%	: 1%	28%	2%	25%

P = Penetrating Wound.

N.P. = Non-penetrating wound.

#### FRACURES.

Femur	Tibia and/or Fibula	Humerus	Radius and/or Ulna	Other sites
5	6	4	8	12

**FIRST AID.**—When the measures available for first-aid are considered, it should be remembered that all equipment had to be head loaded, that water was never "on tap," and that the combat zone was always moving long distances over rugged country. Many were wounded on patrol; a patrol might last a day or a week. Immediate wound toilet was impracticable but sulphonamide powder was applied to the wound surface and a sterile dressing put on, and an improvised splint applied if required. Sulphonamide tablets were given by mouth. In this unpopulated country pyogenic organisms were uncommon. The average time a case took to reach the A.D.S. was twenty-two hours, excluding four cases which took from sixteen to four days.

**CONDITION WHEN FIRST SEEN.**—The local condition of the wounds was good. Only in three cases was pus seen. It was present in a compound fracture of the femur, untreated for sixteen days, in a compound fracture of the ulna and in an abscess formed in a small subcutaneous splinter wound, considered by the soldier to be too slight to need attention, until the abscess formed. The amount of tissue necrosis was considerable and putrefaction of a dead muscle occurred with surprising rapidity. One flesh wound of the calf stank from the diffuent dark flesh eighteen hours after the injury was received.

**SHOCK.**—In many cases this was severe; in the absence of a sphygmomanometer, the chief guides were the pulse rate and volume. I found it most difficult to estimate in the African and most serious operations were preceded by a plasma drip. Many factors aggravated it. Often there was the stretcher carry, before skilled first aid was available, over the usual troublesome tracks; heavy fluid loss due to heat and the difficulty of providing enough to drink aggravated this. One case gave dramatic illustration to this. A disengaging action was being carried out, loads were packed, and the troops ready to march. As the column was moving off a European was brought to the A.D.S. with extensive superficial burns of the face, both arms, neck and chest, back and patches on the abdomen and legs. The M.O. applied an emergency dressing of tannifax, the only treatment then available, and gave morphia. For the next seventy-two hours he was carried on a stretcher, the morphia was repeated at suitable intervals, but he was unable to absorb fluid since he started vomiting. Unfortunately little could be done on the line of march, except to replace the dressings which he tore off in his restlessness. The last ten miles of the march took place during the hottest part of the day across paddy field heated to a furnace temperature. The patient's restlessness became delirium and the delirium changed into coma. On arrival in harbour he was moribund. As

quickly as possible an intravenous glucose saline drip was set up and within a quarter of an hour he was conscious, rational and cheerful. The drip was continued during the night and in the morning a full toilet was made; twenty-four hours later he was evacuated by plane, in good condition and eating well. Subsequently he recovered without disability.

**WOUNDS.**—When a bullet meets with little resistance during its passage through the body it makes a “clean drill,” for which little treatment is needed, but when underlying bone is struck or the shot is tangential, there is commonly a wide laying open of tissue demanding a full debridement. Fragments from Japanese grenades seemed to produce small, superficial wounds with little tissue damage, often confined to peppering of the skin, whilst those from other missiles gave the more typical deep internal pulping.

**OPERATIVE PROCEDURES.**—With the “clean drills,” excision of the wounds, with a gauze pull-through to clean the track, followed by the insertion of a small amount of sulphonamide powder was the usual procedure. This I have called “Wound Excision.” The term debridement is here only used when the entire wound is exposed, after a suitable skin toilet, all foreign matter removed, dead and damaged tissue excised and the area made hæmostatic. A high proportion of wounds receiving debridement were sutured either completely or partially and usually immobilized by plaster of Paris or Cramner wire splinting.

In many cases full debridement was impracticable or perhaps there were numerous small injuries that merited no more than first-aid treatment; these are classified as Wound Toilets. Tables referring to the nature of the operative procedures employed, and to the causative agent are given here.

#### OPERATIVE PROCEDURES.

<i>Debridement</i>	<i>Wound excision</i>	<i>Wound toilet</i>	<i>Other procedures</i>
36	21	13	18

#### CAUSATIVE AGENTS.

<i>Bullets</i>	<i>Fragments</i>	<i>Burns</i>	<i>Non-battle</i>	<i>Multiple wounds</i>
38	37	2	8	21

#### CONSIDERATION OF SPECIAL INJURIES.

Fractured femora were put up satisfactorily in a “Tobruk” splint but fractures of the humerus were difficult to deal with. It was not often possible to immobilize them in a plaster spica, though injuries of the shoulder joint had to be done this way. A reasonable degree of comfort was given using Cramner wire, a U-splint on the inner and outer sides, and a long L at the back, the whole well supported and firmly bound to the chest; but I was dissatisfied with this. Other limb fractures were immobilized with bivalved plasters. The only penetrating head injuries were moribund on arrival and I have no record of them. None was operated upon. The majority of the penetrating chest wounds were associated with hæmo- or pneumo-thorax. Debridement of extensive chest lacerations was usually impracticable although it was done for the smaller ones. These large wounds received a thorough cleaning, some excision, and a liberal sprinkling with sulphonamide and were closed with an airtight suture. They are classified as “Toilets.” Aspiration could not be wisely done with the instruments available and, although no infection was seen whilst they remained in my care, I think it probable that some became subsequently purulent. Of the wounds of the abdomen two were obviously unsuited for operative treatment and both died whilst receiving “resuscitation.” One twenty hours old was treated successfully, and another forty hours old operated upon under the stimulus of the previous success. There was little peritoneal soiling from the multiple perforations but he died from secondary shock, in spite of a transfusion begun at the moment of arrival at the A.D.S. Chloroform anæsthesia, the only one practicable, did not help these cases. A monsoon storm caused the abandonment of another operation. Few non-lethal facio-maxillary injuries were met with; the Dental Officer provided splinting with wire when required.

INFECTION.—The infrequency with which pyogenic infections occurred has been commented upon, and it is not surprising that no case either of tetanus gas or gangrene was noted.

Apart from the injuries to the integument of the genitals, there were only two genito-urinary cases of interest. In one there had been a "clean drill" of the corpus cavernosa, passing through the urethra and doing only trivial damage. An indwelling catheter for three days cured that. Another had a burst of machine gun fire through the upper thigh. One shot had penetrated the sacrum, the bladder, and the pubic bone. Circumstances did not allow an exploration of the bladder and suprapubic drainage was useless since he could not be nursed on his face, for artillery fire kept him in his slit trench most of the time, and he still leaked through the sacrum when the bladder was drained.

ANÆSTHETICS.—Under the prevailing conditions it had been decided that anæsthetics should be limited to chloroform, local and pentothal. The doctor most readily available was the anæsthetist, and the Chaplain frequently and most efficiently gave the anæsthetic when there was no doctor. Local was increasingly used, either to provide a wide regional block, or a nerve block. The following anæsthetics were given.

<i>Chloroform</i>	<i>Local</i>	<i>Pentothal</i>	<i>None used, except Morphia</i>
42	29	2	13

Sickness unfortunately interrupted an effort to trace the end-result of these cases, and no figures can be given, but the opinion made by contacting a few of them, and by discussion, was that the end-results were largely as anticipated. Late sepsis was not observed in any appreciable degree.

## THE TREATMENT OF SMALLPOX.

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[Received December 1, 1944.]

AN account by Leishman and Kelsall of medical cases treated in a large hospital in India [1], stimulated by Bulmer's article in a previous publication [2], records very clearly the successful treatment of smallpox with sulphathiazole. Their experience of smallpox is striking to me, as I observed the same results in Northern Persia in the treatment of smallpox with sulphathiazole in approximately the same period, November, 1942, to April, 1943. They record "the results were sufficiently striking to make us deeply regret that the drug had not been given from the start"—a statement that I endorse.

Since the advent of the sulphonamide drugs in the treatment of smallpox, various people have tried them with indeterminate results. Most of the earlier records [3, 4, 5, 6] of the use of sulphanilamide or sulphapyridine are conflicting in their impressions, and are based on "clinical impressions." It is interesting to note, however, that in 1941 King and de Rozario [7] record a case of smallpox treated with prontosil, and made this observation:—"The secondary rise of temperature, which is part and parcel of every smallpox, did not occur; this can only have been due to prontosil." Wilkinson [8] working in Hong Kong with sulphanilamide in a carefully observed series of experiments concluded that the drug was "extremely effective in the treatment of many of the complications associated with the focal phase. There is evidence that if the drug be given early in the focal phase, it may modify the number of lesions, the incidence of septic complications, and the subsequent degree of scarring."

### PERSONAL EXPERIENCES.

Smallpox is endemic in Persia. During the winter 1942-1943 the incidence increased in the civilian population. During December cases began to occur in British troops. The Medical Division with which I was associated catered for European personnel only. A search of the limited literature available was made for methods of treatment. Wilkinson's article was found and Major Martin Hynes, R.A.M.C., saw by chance a review of some work done in Spain by two Germans, recorded in a German publication, which supported Wilkinson's article. The exact reference I have since been unable to find.

Moderate and mild cases were treated by orthodox methods, local application to the rash, and symptomatically. They recovered with various periods of illness and scarring.

Nine really severe cases occurred—seven of them being exceptionally serious. They all had eruptions covering the face, hands and feet, were confluent and hæmorrhagic. The two earliest cases were treated on orthodox lines without sulphonamide drugs. The third case was treated with sulphapyridine and the remaining six cases were treated with sulphathiazole.

The first two cases arrived within a few days of one another. Local applications of acriflavine, 1/1,000, and potassium permanganate solution were used to the skin lesions. No attempt was made to treat them except on very orthodox lines. The results gave us all an unpleasant shock. Both developed a hæmorrhagic confluent eruption of face, hands, arms, feet and legs and died in the early purulent stage. During this unpleasant experience the fact that the urinary output fell and the fluid intake increased at the stage of vesiculation was noticed. Excessive thirst was marked. At the time sulphanilamide was in short supply, but there was a plentiful supply of sulphapyridine.

Case three soon appeared. He was treated with sulphapyridine without result and it is interesting to note my final remarks on his case notes—"In future I intend to proceed with treatment along the lines of copious fluids either by mouth, or intravenously—the intake being governed by the urinary output. I intend to abandon the sulphonamide group entirely." Such was our disappointment.

A gift of sulphathiazole from the American Red Cross stimulated us to try again. This time we continued to give copious fluids, the same standard of treatment to the skin, and sulphathiazole instead of sulphapyridine. The results were a repetition of Leishman and Kelsall's experience, "Sufficiently striking to make us regret deeply that this drug had not been given from the start."

In all, an attempt was made to keep the urinary output up to 50 ounces or more in the twenty-four hours. If this became impossible by mouth owing to vomiting it was decided that we would resort to the intravenous route. This actually became necessary in the case treated with sulphapyridine. In all four cases there was a standard treatment for the skin. It consisted of a bi-daily application to the whole skin of a solution of potassium permanganate of such strength that we were unable to see the white reflection of the bottom of an enamel beaker.

The whole body, front and back, was dabbed with a lint swab, fixed to the end of a large rigid wooden spoon, and saturated with the solution. While this was being done the patient lay on a sheet on his bed, was rolled on to his face while his back was done, and remained uncovered until the skin had dried sufficiently to return him beneath his bedclothes cradle. Four cases were hæmorrhagic with a uniformly severe degree of rash involving face, hands, forearms, legs and feet. They were severe cases of smallpox.

Only those who have seen smallpox in its severest forms can know what the word "toxicity" means. It is expressed, not only in the general appearance with a rapid pulse and the body almost shaking with each systole, but in the œdema of all the areas affected. Eyes are closed and the facial features bear no resemblance to the patient before his illness. The buccal cavity is swollen, with a purulent bronchitis becoming marked in the terminal stages. It is a disease in which the patient's appearance denotes the severity of his illness and in which perhaps judgment of "toxicity" on clinical grounds is justified. It is regretted that for this reason the most striking features of the experience must be left to be expressed in terms of "toxicity."

Leishman and Kelsall have attempted to express their impressions of toxicity when they state, using sulphathiazole, "If dosage was started some days before the expected onset of pustulation, this could be aborted or modified with control of the secondary fever and great reduction in 'toxicity.'" This was certainly my experience. The contrast of toxicity in the purulent stage between those cases treated on orthodox lines and those treated with sulphathiazole was far more striking than the phrase "the toxicity was less" conveys. Unfortunately that short phrase is the only way in which the most striking feature of sulphathiazole treatment can be conveyed.

Others have suggested that the sulpha group of drugs may influence or modify the extent of vesiculation [4, 5, 6, 7, 8].

All cases treated suffered marking of the affected areas. The amount of scarring is probably diminished in the deeper skin layers with sulphathiazole, but convalescence always produced a disappointing amount of pitting.

#### COMMENT.

There seems sufficient evidence from the literature to suggest that sulphanilamide reduces the toxicity of the pustular stage in smallpox. Leishman and Kelsall, however, report disappointing results with sulphapyridine; my experience was the same. Sulphathiazole gave a repetition of their good results. This was most marked in the diminution of toxicity in the pustular stage which was altered to an uneventful course. There was no change in the extent of the rash, but the degree of œdema of the skin lesions was markedly reduced.

A similar diminution was noted in the intensity of the lesions in the mouth, and in the respiratory tract. There was an absence of purulent bronchitis.

Interest in the fluid intake and output was aroused when the urinary output fell so noticeably in the first two fatal cases in the stage of vesiculation and pustulation. It was considered that the drop was due to the loss of fluid into the vesicles and the surrounding oedema. Because of this point, and realizing that an adequate urinary output was required with sulphapyridine, great care was taken to try to keep the urinary output up to 50 ounces per day. Glucose saline was used, as serum was unavailable, but the effort failed. Sulphapyridine seems to have little effect on the skin condition in the dosage given and the fluid would seem to have increased the oedema of all the lesions. The use of plasma may have avoided some of this oedematous result, but it could not have altered greatly the effect of sulphapyridine which was so unpleasant on a patient already ill.

Measurement of the fluid intake and urinary output was persisted in with the use of sulphathiazole, as it was thought that the quantity of fluid lost in the tissues would be roughly shown in this way. The first two cases reported here illustrate what is meant. However, later cases failed to show this fluid "retention." It may have been due to giving the drug earlier in the stage of vesiculation, so that no conclusion can be drawn from these observations. The choice of case presents no difficulty. The rash first appears as a macular one and its extent is appreciated early in the disease. It may be difficult for the uninitiated to realize at this stage that these innocent looking areas become the unpleasant lesions into which they later develop. For the most part the subsequent rash is in proportion to the severity of the first stage of the disease; a high temperature (103° to 105°), and an ill patient, are fair reasons to expect an extensive rash, which will require more than a natural or an acquired immunity to overcome, in the purulent stage. It is best to start using the drug early in the vesicular stage. Copious fluids can be given at the same time without any untoward effects.

#### SUMMARY.

- (1) Cases of smallpox were treated with sulphapyridine and sulphathiazole.
- (2) No success was met by treatment with sulphapyridine.
- (3) Treatment with sulphathiazole was successful, the most striking feature being in the freedom from toxæmia, and complications in the purulent stage of the disease.

I would like to express my thanks to Captain H. Campion, R.A.M.C., whose keenness and interest made this recording possible, and to those Nursing Officers who, working under such trying conditions, added their efforts to these results.

I am indebted to Colonel K. Fletcher-Barrett, O.B.E., Commanding a British Military Hospital, for permission to forward these notes.

#### REFERENCES.

- [1] LEISHMAN, A. W. D., and KELSALL, A. R. *Lancet*, 1944, 2, 231.
- [2] BULMER, E. *B.M.J.*, 1943, 374.
- [3] MUKERJI, S. K. "Sulphapyridine and Allied Drugs in Smallpox." *Indian Med. Rec.*, 1942, 62, 235-238 (August).
- [4] VENGSAKAR, S. G., POONEN, T. U., and WALAVALKAR, S. A. "Effects of Sulphanilamide in Smallpox," *J. Indian Med. Ass.*, 1942, 11, 361-365 (September).
- [5] McCAMMON, W. O. "Sulphanilamide in Treatment of Smallpox," *J. Amer. Med. Ass.*, 1939, 112, 1936-1937 (May 13).
- [6] PATEL, T. B., and NAIDUB, P. D. "Smallpox and Sulphonamide," *Indian Med. Gazette*, 1940, 75, 730-732 (December).
- [7] KING, C., and DE ROZARIO, K. A. "Prontosil in Smallpox," *Antiseptic*, 1941, 38, 177-179 (March).
- [8] WILKINSON, P. B. "Sulphanilamide in the Treatment of Smallpox: Review of 103 Cases," *Lancet*, 1942, 2, 67-69 (July 18).

[It is regretted that, owing to pressure on space, detailed case reports and temperature charts have been omitted from this article. This does not detract from its value.—EDITOR.]



## Clinical and Other Notes.

### A NOTE ON THE TRANSMISSION OF INFECTIONS BY MESSING UTENSILS.

By Major J. A. BOYCOTT, D.M.,  
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[Received April 23, 1945.]

CERTAIN experiments were undertaken to test the hypothesis that infections of the gastro-intestinal tract might be transmitted by messing utensils; the source of the infection might be a previous user, or the person cleaning the utensil, or might arise from another utensil in the process of cleaning.

(1) The bacteriology of "clean plates." Cultures were made from plates taken at random from the stock pile of "clean" plates in the cookhouses of three units. All plates were used in common in these units.

*Method.*—A throat swab wetted with digest broth was wiped once round the circumference of the depressed part of the plate and cultured on digest broth and MacConkey agar. Lactose-fermenting organisms that failed to grow on Koser's citrate medium were considered to be of faecal origin.

The results were as follows: (a) China plates washed in a "good" mains supply under cover; 3 out of 6 yielded faecal coliform organisms. (b) China plates washed in the open in hot, but not boiling, river water: 2 out of 6 yielded faecal coliform organisms. (c) Tinned iron plates used in a hospital ward where dysentery cases were nursed: 5 out of 5 yielded faecal coliform organisms or paracolon organisms (i.e. Lact. O; Gluc. AG; Mann. AG; Dulc. O; motil. +). No pathogenic organisms were found.

The sterilizing effect of washing with warm soapy water is evidently small. Faecal organisms, by whatever route they arrive, are quite common on "clean" plates.

(2) A comparison with another method of washing. In the U.S. Army it is customary to wash plates after meals in three successive containers of water kept boiling over a fire. The first two are filled with soapy water and the third with clean. In this experiment the method was modified so that the first and third contained clean boiling water; it was hoped that if this method was adopted it would be possible to recover grease from the first container. After leaving the third container the plates were not wiped dry but allowed to drain on edge. The remains of a greasy meat meal were on the metal plates used for this experiment. As a control, an equal number of plates from the same meal were washed with hot soapy water and dried with a clean cloth.

The plates were cultured as in (1) immediately after washing and again after three hours. The results are shown in Table I.

Plate	Method	18 hr. broth	36 hr. MacConkey All orgs.	Faecal orgs.
1	A	—	+	—
2	A	—	—	—
3	A	—	—	—
4	A	—	+	—
5	A	+	+	—
6	A	+	+	—
7	B	+	+	+
8	B	+	+	+
9	B	+*	+*	+
10	B	+	+	+†
11	B	+	+	+
12	B	+	+	+

A = cleaned by the "three bucket" method.

B = washed in warm soapy water and dried on a clean cloth.

\* = *Staph. aureus* (coagulase positive).

† = *Bact. morгани*.

*Note.*—Cultures taken from the same plates three hours after washing gave the same results except for the airborne saprophytes in three plates from each group.

It appears plain that the U.S. Army method gives superior results to simple washing, as might be expected. To judge from the practice of the U.S. Army in the field their method does not present any difficulties that cannot be overcome by a little ingenuity. It should be noted that the control washing in this experiment was carried out under better conditions than is usually possible; hot running water and clean dish- and drying-cloths were used.

The object of the cultures taken three hours after washing was to detect any airborne contamination. The presence of sarcinæ and organisms of the type of *Bac. subtilis* in these suggested that such contamination was prevalent. No faecal or pathogenic organisms were, however, found that were not present in the cultures taken immediately after washing.

(3) The influence of the drying-cloth. Pickles (1932) reported an epidemic of Sonne dysentery in a school where the vehicle of transmission was a communal towel. It was thought worth while to compare the effect of allowing plates to drain and of drying them with a cloth that was sterile at the beginning of the experiment. In both cases the plates contained the residue of a meat meal. The results are shown in Table II.

TABLE II.

Plate	Method	36 hr. MacConkey	
		All orgs.	Fæcal orgs.
1	C	—	—
2	C	—	—
3	C	+	—
4	C	+	+
5	C	+	—
6	C	+	+
7	D	+	+
8	D	+	—
9	D	+	+
10	D	+	+
11	D	+	+
12	D	+	+

C = allowed to dry by draining on edge.

D = dried with a clean cloth.

It was not considered that these figures were sufficiently striking to justify any change in the normal procedure, except in the presence of an epidemic of gastro-intestinal infection. The results suggested two further experiments.

(4) Transmission by the drying-cloth. A. A drying-cloth, sterilized in the autoclave, was sprinkled with 20 c.c. of a broth culture of *Ps. pyocyaneus* and dried at room temperature for three hours. (This organism was chosen as easily recognizable.) The cloth was used to dry 6 successive plates that had been washed in hot soapy water. Cultures made immediately after drying showed the test organism on 5 out of 6 of the plates.

B. 5 c.c. of the same culture was stirred into the remains of a meat meal on a plate. The plate was washed in hot soapy water and dried on a sterile cloth. The cloth was then used to dry 6 further plates which had been washed. 5 out of 6 gave positive cultures.

The contamination in these experiments was a heavy one but the danger of the contaminated cloth is quite clear.

(5) The use of water sterilizing powder. As an alternative to the use of the "three bucket" method the use of W.S.P. was considered. Plates were washed in hot soapy water and, after rinsing in clean water, were submerged in water containing 100 parts W.S.P. per million. Unfortunately, with the facilities available, no method could be found of overcoming the inhibitory effect of the W.S.P. on the test cultures. Under all conditions the plates were sterile after this treatment.

This method was used for three days in a dining hall when the tests were made, and there was no complaint of the taste.

#### CONCLUSIONS.

These experiments have no more than a suggestive significance. Nevertheless it seems that the usual methods of cleaning plates after meals do not remove potentially pathogenic

contamination. The drying-cloth and presumably the dishcloth are able to transfer contamination from plate to plate. The U.S. Army "three bucket" method and immersion in water containing W.S.P. are both probably effective as methods of preventing the spread of infection. Under conditions where each man uses his own mess tin, the danger of transmitting infections is less.

## REFERENCES.

PICKLES, W. N. (1932). *Lancet*, ii, 31.

*Amer. Jour. Pub. Health* (1944). Mar., 34, No. 3, 255-8.

The latter (not quoted in the text) is a valuable review of this subject.

## SOME CASES OF METHYL ALCOHOL POISONING.

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AND

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[Received June 24, 1945.]

VICTORY in Europe was doubtless celebrated in many different ways in the various parts of the world, but in few places can the results have been so tragic as in one area of North-West Germany where some British soldiers were entertained to a party by some Russian "displaced persons" and partook with their hosts of some drinks containing wood alcohol. The hosts suffered much the more severely, but the following account is concerned solely with 10 British soldiers, 9 of them from one unit, who were admitted to a British military hospital the first or the second day after. To these is added another case who came under our care a fortnight before as the result of a similar incident elsewhere.

It was not possible to obtain an estimate of the quantity of methyl alcohol taken by each man. Most did not remember well, and in any case the spirit had partly been used in unknown quantity to fortify a wine or beer. A sample of this spirit was later obtained and analysed; it contained 87 per cent methyl alcohol.

Similarly it is not possible to describe the immediate effects of the methyl spirit, because analysis of the blood showed that they had all had ethyl alcohol as well, and the usual effects of the latter would probably veil any specific effects of the former. These specific effects began to show themselves next day and they varied much in severity. A few of the fatal cases complained of dizziness and were confused throughout, but others, including three of the most severe, were well enough to walk into hospital. One man (J. H.) felt quite well the first day after he drank the spirit and did a full day's duty in his unit; the following afternoon he felt ill but could walk into hospital, and yet he died that evening. It was characteristic of some of these cases that deterioration after such a latent period was alarmingly rapid so that half an hour or so after a man had given a lucid account of himself and been found to have a normal strong pulse he would become confused or nearly comatose and his pulse would be almost imperceptible.

*Mortality and Residual Disability.*—Of the 11 cases admitted, 6 died. Of those who recovered one was totally blind when evacuated on the seventh day. Another had slightly impaired visual acuity when returned to duty on the ninth day.

*Time of Survival.*—If it is assumed that the average time at which the alcohol was consumed was 20.00 hours, then the times of survival of the 6 fatal cases were 24, 25, 33, 39, 41 and 50 hours, giving an average of 35 hours.

*Clinical Features.*—(1) Vomiting was prominent in three patients but in only one of these was it so persistent as to interfere with the taking of fluids by mouth.

(2) Dizziness was complained of by most patients as an early symptom. None of the 5 patients who walked into hospital had an obvious staggering gait.

(3) Restlessness and confusion. These were recognized as bad signs and only one patient in whom they developed recovered.

(4) Fits. Epileptic fits occurred shortly before death in 2 of the men.

(5) Dyspnoea. Four of the fatal cases and the severe non-fatal case (A. K.) all showed at the time they were ill a very characteristic dyspnoea of the air-hunger type, that is to say, with respirations increased both in depth and rate. It coincided in onset and duration with the restlessness and confusion. Unfortunately no facilities were available for estimating the  $\text{CO}_2$  combining power of the blood.

One case (J. H.) developed Cheyne-Stokes respirations very shortly before death.

(6) Visual effects. 10 out of the 11 patients had intermittent blurring of vision as an early symptom. At this stage the pupils and fundi showed no abnormality. In 5 cases gross loss of vision succeeded, and then the pupils were dilated and inactive.

Definite oedema of the optic disk was noted in only 2 patients. In A. K., who survived with complete loss of vision, it became very marked. One other fatal case (G. T.) developed gross pallor of the central area of the retina without actual oedema. In A. K. the oedema developed during his second and subsequent days in hospital, so that it is probable the other severe cases died before oedema could become established.

Retinal hæmorrhage was seen once, in the other patient (F. D.) who had swelling of the disk. It was a single large round hæmorrhage in the superficial layers of the retina close to the disk below the superior temporal branch of the vein and, in the opinion of Major Heath, the ophthalmologist, closely resembled the type seen in fat embolism.

In one man who recovered slight impairment of vision persisted but objective evidence of retinal damage was never definite in him.

*Blood Alcohol.*—Details are given in the accompanying table.

Case	Blood alcohol in mg. per c.c.				Remarks
	Time after consumption hours	Methyl alcohol	Ethyl alcohol	Total alcohol	
R. C.	45	Present	—	0.6	Recovered
A. P. G.	45	Present	0.6	—	Recovered
P. C.	45	Present	—	0.5	Recovered
G. E.	45	Trace	0.4	—	Recovered. Slight impairment of vision
A. K.	24	1.2	1.6	2.8	Recovered with total blindness
W. A.	24	2.0	1.6	3.6	Died
F. D.	24	1.5	2.0	3.5	Died
J. H.	48	0.96	0.53	1.49	Died
G. S.	24	1.3	0.9	2.2	Died
J. S.	24	1.8	2.0	3.8	Died
G. T.	24	0.8	1.4	2.2	Died

Urine analysis of J. H. : Methyl alcohol 1.96 mg. per c.c. Ethyl alcohol nil.

*Treatment.*—Gastric lavage was performed in some of the patients admitted within the first twenty-four hours.

No specific antidote was known, and the most hopeful line of treatment appeared to be to attempt to wash the alcohol out of the blood by promoting powerful diuresis. All patients were therefore given glucose saline drip infusion and encouraged to drink copiously. In the 5 patients who received these measures they were supplemented by oral administration of caffeine citrate 5 grains four-hourly for 4 doses and in them, despite the hot weather, a diuresis averaging  $2\frac{1}{2}$  litres in the twenty-four hours was achieved. These were all, however, mild cases *ab initio* and no conclusions can be drawn as to the value of the drug except that it does promote a good flow of urine.

#### SUMMARY.

An account is given of 11 cases of acute methyl alcohol poisoning of whom 6 died and one of the survivors became totally blind.

The clinical features are indicated and emphasis laid on the delayed onset of major symptoms in some instances.

Details are given of the ophthalmological changes and the levels of methyl and ethyl alcohol in the blood.

The treatment adopted is briefly described.

Our thanks are due to Lieutenant-Colonel J. B. MacFarlane, R.A.M.C., Officer Commanding a General Hospital, for permission to forward this paper, and to Major C. Heath, R.A.M.C. and Major A. Houlbrooke, R.A.M.C., for the ophthalmological details and the blood analyses respectively.

### COMBINED OPERATIONS.

By Major J. B. BAMFORD,  
*Royal Army Medical Corps.*

[Received January 27, 1944.]

COMBINED OPERATIONS is a term denoting close co-operation between the various Services and is familiar to all but the great benefit that comes from closer co-operation between the various Corps within the Service is not always realized by all doctors.

It is the object of this paper to describe a few pieces of apparatus which have been made for me in the field by the close co-operation of workshops of R.E.M.E., R.E. and R.A.S.C. For these to be done through "the usual channels" would not only take many months but has the great disadvantage of the user being unable to explain and discuss the apparatus with the actual technician who does the work and whose advice, suggestions and criticisms are often invaluable.

All the following items were made by mobile units in the field.

#### (1) TRANSFUSION STAND TO CLAMP ON STRETCHER.

This stands 3 ft. 6 in. high. The advantages are: (a) Being firmly attached to the stretcher, it does not get knocked over or in the way; (b) it moves with the stretcher without having to have a third person to carry it; (c) it holds any type of bottle firmly (by means of movable spring clamps) during transit from ward to theatre and by ambulance where it has proved invaluable; (d) simple and compact (see figs. 1, 2 and 3).

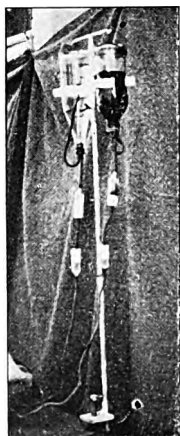


FIG. 1

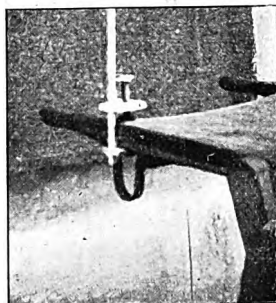


FIG. 2

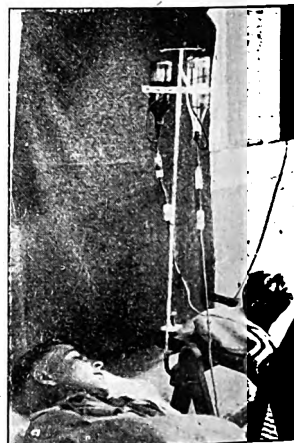


FIG. 3

(2) SINGLE PHASE CO<sub>2</sub> ABSORBER WITH STAND.

The CO<sub>2</sub> absorber is a Waters' type, made from an ovaltine tin and wire mesh from fly swats. The connexions are completely airtight and perfectly made. The stand is a great effort and is adjustable and holds the tin firmly. The base is either placed under the patient's shoulder or head to steady it.

## (3) ADAPTORS FOR ITALIAN GLASS SYRINGES.

Two types of adaptors were made out of brass: (a) To fit the Italian glass 5, 10, 20 and 50 c.c. syringes to take the British Army needles; (b) to fit the Italian glass 2 c.c. to take the British Army needles.

## (4) SHARPENING AND RESETTING SURGICAL SCISSORS AND PLASTER SHEARS.

This is a very great asset in the field and is most efficiently and quickly carried out by any R.E.M.E. workshops.

## (5) FITTINGS TO FIELD PATTERN BOYLE'S MACHINE.

(a) Converting lid as a tray; (b) iron ring to hold O<sub>2</sub> cylinder.

The lid of the Field Pattern Boyle's machine is strengthened by metal corner pieces and screw attachments for travelling, replacing the hooks. The lid is inverted and two metal bolts passed through holes in the front of the machine and one side of the lid, thus making an anæsthetic tray and incidentally preventing the lid from getting lost. Alternatively this can be done by hinging the lid to the front of the machine, which necessitates the removal of the metal band in front. The oxygen cylinder is held firmly in place by a metal ring and screw. The ring is bolted to the machine and is easily removed for travelling. It replaces the chains supplied for this purpose.

## (6) PORTABLE EMERGENCY LIGHTING SET (see fig. 4).

Two 12-volt batteries are carried in stout wooden boxes with plugs wired to the outside for quick and easy access. The lamp is carried in a stout box suitably padded. The lamp was adapted by attached R.E.s who also made the simple but efficient main operating light which runs off a generator (see fig. 5). This light covers the whole length of the operating table and is invaluable for patients with multiple wounds. Each lamp has a separate switch and in my opinion its simplicity and easy construction deserve special mention.

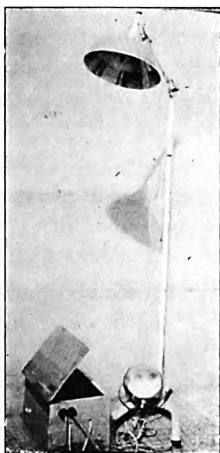


FIG. 4



FIG. 5

(7) CRATE FOR CARRYING STRETCHER TRESTLES (*see fig. 6*).

This consists of a solid wooden base and top held together by four long metal bolts. This converts the trestles, which are awkward bulky articles to pack on a lorry, into a very useful box in the centre of which many articles can easily be packed and carried. This proved a great success.

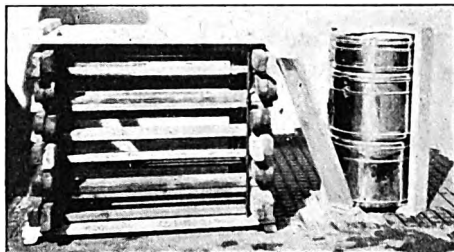


FIG. 6

## (8) CRATES FOR CARRYING STERILIZING DRUMS (AUTOCLAVE PATTERN).

Operating drums must be protected if they are to retain their efficiency. Instead of nailing these down each time into crates, a hinge is put on the bottom of one upright and a simple home-made catch (small piece of tin, staples and nail). This catch has been used extensively for many boxes and crates and found efficient and very simple to make (*see fig. 6*).

## (9) NUMEROUS FITTED BOXES FOR INSTRUMENTS, TYPEWRITERS, ETC.

Boxes with high hinged lids are invaluable in a mobile unit. Some have been made with trays and compartments for bottles, etc.

## (10) SMALL WOODEN STAND FOR AMPOULES.

Small wooden stand to hold pentothal ampoules, coramine ampoules, etc. This maintains the ampoules in the upright position and avoids spillage.

The high class of workmanship as turned out by R.E.M.E. in the field has to be seen to be believed. The close co-operation and workmanship of R.E.M.E. workshops more than deserves special mention. I have been very much impressed by the willingness to help and the keen interest taken by all ranks of the various workshops.

The numerous other appliances, ranging from underground and mobile operating theatres to tin mugs, that have been made by the willing co-operation of the R.E. and R.A.S.C. workshops on my behalf, when working with a Hospital, Mobile Surgical Team and Field Surgical Units in the Desert, are too numerous to be included.

I also feel that in civilian life there is not enough co-operation between the Medical and Engineering professions, especially in devising splints, improving Balkan frames and in numerous other ways; even the local village blacksmith is always willing to turn out Bohler's Walking Irons efficiently and cheaply!

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### Reviews.

ACUTE INJURIES OF THE HEAD. Second Edition. By G. F. Rowbotham, B.Sc. Manch., F.R.C.S. Eng. Edinburgh: E. & S. Livingstone, Ltd. 1945. Pp. xiv + 424. Price 30s. net.

Mr. Rowbotham's monograph has grown from the first edition (1942) of 288 pages and 124 illustrations to a second edition (1945) of 424 pages and 201 illustrations. This increase has resulted from the inclusion of seven new chapters, some of which deal with such highly specialized aspects of cranial trauma as rehabilitation, traumatic osteomyelitis, the mechanism of birth injuries, and post-traumatic epilepsy. Designed as a monograph "written primarily

for those who are responsible for the treatment of acute cerebral trauma and who have not received a special training in neurosurgery," the addition of much fresh specialized information and the considerable extension of the text dealing with traumatic mechanisms and the pathology and diagnosis of closed head injuries may make this second edition more useful as a textbook for detailed study rather than a handbook for immediate reference. The short new chapter dealing with final results is most valuable; it is mainly statistical and provides a clear picture of the end-results to be expected by tabulated analyses of the cases reported by Cushing, Jefferson, Ascroft, Eden, Brain, Symonds, Russell, and the author.

While it has been necessary to present a specialized subject at times somewhat dogmatically, Mr. Rowbotham is to be commended for the restraint he has shown in handling such aspects of treatment, for instance, as surgical exploration in closed head injuries, which is still the subject of inquiry and discussion among neurosurgeons. The author's qualifications to present this monograph are of the highest order, and the principles of management which he has established here may be confidently followed by the general practitioner, on whose capacity to handle head injuries in the early stages the late results will always largely depend.

That this edition may achieve the object for which it was published is probably indicated by the remark of a graded general surgeon who, after looking through it briefly, said: "Now, if I had only had this with me in Greece. . . ."

This edition is beautifully illustrated, contains a useful bibliography, and may with advantage be added to the library of any general practitioner. G.P.

HEY GROVES' SYNOPSIS OF SURGERY. Twelfth Edition. Edited by C. P. G. Wakeley. Bristol: John Wright & Sons, Ltd. 1945. Pp. viii + 632. Price 25s. net.

Professor Hey Groves died in 1944. The twelfth edition of his well-known Synopsis is edited by Surgeon Rear-Admiral C. P. G. Wakeley who, in his preface, pays a fitting tribute to the original author. A happy likeness of Hey Groves is included as a frontispiece.

The work is essentially an aid to final revision by the undergraduate student but is also a handy abbreviated reference book for practitioners. Generally speaking, abbreviation has not been carried to a degree in which little can be learned; many of the sections are almost as full as chapters in some textbooks. Hey Groves kept revising and bringing the work up to date and the present editor has followed the same procedure. The work, however, is essentially as in previous editions; descriptions of some of the old amputations which are not in use have been omitted; modern methods of radium therapy have been incorporated.

While the new editor claims that the inclusion of penicillin and the sulphonamides in wound treatment has necessitated a re-writing of some chapters, the reviewer cannot find more than a few lines on these drugs. Their nature, varieties, action and administration surely deserve elaboration.

Surgical textbooks of the future will probably contain a little more about war surgery than in the past, especially since lessons applicable to civil surgery have been learned in this war. It is disappointing therefore to have wound treatment almost abbreviated to "excise wound in one-shaped manner, with superficial and deep tissues which have been torn and infected." Again, delayed primary suture is advised within 48 hours, whereas general opinion is in favour of the optimum time being between the third and fifth day.

The chapter on shock might also be revised with advantage in view of war experience; it is written too much in relation to operative shock.

The treatment of aneurysmal varix by "pressure or ligature of the artery or suture of the opening in the arterial wall" is inefficient as regards the first and second methods, and usually impracticable in respect of the third.

There is a bad slip on p. 19 where it states in connexion with arterial embolectomy that the site of the embolus can usually be determined by the distribution of the gangrene, a somewhat late event to warrant the operation.

Nevertheless these criticisms affect but a small part of a work which, in its own particular way, is excellent.



## *Correspondence.*

### THE ROD AND THE SERPENT AND OTHER BADGES.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I have read with much interest Colonel Poston's article "The Rod and the Serpent and Other Badges" in the May issue of the *Journal of the Royal Army Medical Corps*. I note that in the opening paragraph he states that "neither the Sailor nor the Airman wears them on his uniform." This statement is not quite correct as the following Branches of the Royal Air Force wear badges on their service dress:—Medical Branch, Chaplains' Branch, Education Branch.

On page 229, at the end of the first paragraph, he states that the "R.A.F. Medical Service wear the Caduceus as their professional badge on the collar."

Bushey Park,  
Teddington.

June 23, 1945.

Yours faithfully,  
D'ARCY POWER.

(From Air Commodore D'Arcy Power, C.B.E., M.C.)

## *Notices.*

### ARMY MEDICAL DEPARTMENT BULLETIN.

*A.M.D. Bulletin* No. 47 and Supplement No. 22, May, 1945, have now been published by the War Office. Distribution scale: one copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

##### *Article No.*

355. *Syphilis; Yesterday and To-morrow.*—A glance back to the days when doctors thought that syphilis and gonorrhœa were one disease and an account of the steps that led to recognition of the two infections as separate entities. To-day, there is one treatment—penicillin—for both diseases. The small dosage required to cure gonorrhœa may mask signs of syphilis acquired at the same time and this imposes the need for an open mind in looking out for signs of suppressed syphilis.
356. *Ancylostomiasis Complicating other Disease—A Reminder.*—Realism is needed when ancylostoma ova are found in stools during routine investigations. Apart from routine treatment there is no need for keeping the patient in hospital unless symptoms persist or ova are numerous.
357. *Dressing Technique versus Sepsis.*—A recapitulation of the points to be observed in keeping wounds free from secondary infection—no exposure of wounds during bed-making, adequate masking of all concerned (including the patient), "no-touch" technique, and dry hands.
358. *Sulphonamide—Acridine Sensitization.*—Acridines and sulphonamides should not be applied either concurrently or consecutively to infected skin lesions because dermatologists believe that such treatment carries a high risk of sensitization.
359. *Local Use of Sulphonamides.*—A general review of problems connected with the local application of sulphonamides.

360. *Transfusion and Venous Spasm*.—Collapsed veins are a common cause of difficulty in transfusion ; by comparison venous spasm does not often give trouble. Methods of overcoming it are suggested.

*Supplement No. 22. The Two-stage Operation in the Treatment of Wounds in the Italian Campaign*.—This is an up-to-date account of the latest surgical practice in treating battle wounds. Good surgery, good organization and penicillin have made early closure in two stages an outstanding success.

*A.M.D. Bulletin* No. 48 and Supplement No. 23, June, 1945, have now been published by the War Office. Distribution scale : one copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

##### Article No.

361. *Penicillin for Gonorrhœa*.—If gonorrhœa is treated with 5 intramuscular injections of 30,000 units of penicillin at 2-hourly intervals, relapses will be extremely rare. The patient should be admitted to hospital if possible, but details are given for M.O.s who, in exceptional circumstances, may have to carry out this treatment in camp reception stations.
362. *Artificial Respiration*.—A little-known method of artificial respiration is described and illustrated. The principle is to encourage inspiration by intermittent traction on the costal margin while natural recoil of the chest wall is aided by gentle pressure on the lower ribs.
363. *Drugs for Relapsing Vivax Malaria*.—Quinine grains 10 and pamaquin 0·01 gramme three times a day for 10 days is good treatment for relapses of *vivax* (B.T.) malaria. The relapse rate following this course was significantly lower than that following a prolonged mepacrine course—in one series 10·3 per cent as against 34·0 per cent. For Indian troops, the dose of pamaquin should be reduced to 0·02 gramme daily and they should be carefully watched for toxic signs—especially hæmoglobinuria.
364. *Pentothal in Forward Areas*.—In forward areas pentothal should not be used if the patient will reach an Advanced Surgical Centre within 4 hours ; morphine grain  $\frac{1}{4}$  intravenously will give sufficient analgesia for splinting. Pentothal should be used with caution ; “ shock ” delays its excretion, and only experienced anæsthetists should use it for abdominal cases.
365. *Casualties from Screening Smokes*.—Out of doors screening smokes do not normally attain such concentrations as will produce toxic effects in man. But, in enclosed spaces, they may cause severe respiratory damage that requires treatment on the lines described for phosgene poisoning.

*Supplement No. 23. Nutritional Deficiency Diseases in the Armed Forces*.—These diseases are exceptional, and this description is given, not to stimulate the diagnosis of more cases, but, by presenting a true account of such nutritional disorders as have been seen, to help M.O.s to get matters in their true perspective. When diagnosis is difficult there is a temptation, which should be resisted, to attribute obscure conditions to “ nutritional deficiency.”

*A.M.D. Bulletin*, No. 49, July, 1945, has now been published by the War Office. Distribution scale : one copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

##### Article No.

366. *The Heart in Scrub Typhus*.—Recent surveys have shown that many scrub typhus patients are aware of symptoms that suggest heart disease to themselves and their doctors. But these are due to temporary cardiovascular instability ; true cardiac damage is exceptional.

367. *The Suicidal Soldier*.—Suicidal soldiers may be melancholics, misfits, psychopathic personalities, or sufferers from organic disease of the nervous system. They should be watched for because mental disease in soldiers is often temporary; it is particularly tragic when a life is lost because suicide was not suspected as a possibility and no precautions were taken to supervise the man or remove the means of self-destruction.
368. *Mobile Medical Teams*.—Physicians, like others in the Medical Services, have been getting into forward areas in small, mobile groups with great advantage to everyone including themselves.
369. *Management of Schumine Casualties*.—Schumine casualties are not so much of a problem to resuscitation officers as men wounded by larger types of mine. But men with Schumine injuries may die soon after wounding from fat embolism or anuria. The best treatment is to apply a tight dressing above the shattered part of the limb and get the man to a surgeon who will first apply a tourniquet and then amputate in such a way as to remove all damaged muscle.
370. *Air Embolism During Transfusion*.—Air embolism during transfusion may result from several causes: if the level of blood in the bottle falls below the exit tube, especially if positive pressure is applied; if air is not displaced from the tubing before connecting it with the needle in the vein; if ill-fitting or perished rubber tubing is used; or if, while tying in a cannula, a ligature is placed through instead of around the vein. An additional recently-described cause is raising of pressure in a bottle whose inside mantle filter is partly blocked. (With Army Blood Supply Depot apparatus there is no filter inside the bottle so this risk will not arise.) Air embolism may be commoner than we suppose because it will easily be missed at autopsy without special attention to technique.
371. *Wound Healing in the Tropics*.—Another attack on the old boggy that wounds cannot heal well in the tropics. With a good aseptic technique and gentle handling of the tissues, results can be excellent even in very unfavourable conditions.
372. *Civil Appointments*.—Further civil appointments open to doctors in the Forces at home and abroad.
373. *Nuffield Medical Fellowships*.—These fellowships, worth £500-£800 a year, are for men interested in social and preventive medicine who seek to make a career along these lines. Those in the Forces may apply now.
374. *Common-sense in Penicillin Dispensing*.—A little extra penicillin will do good, so there is no need to be fussy if the ampoule or bottle contains more than enough for one patient but not enough for two. The extra amount should be given to the patient and not held over for next day.

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#### THE HARDEN V.C. MEMORIAL FUND.

By the middle of August this fund had amounted to just over £10,000. It is now closed. This is a most gratifying and generous response and the future of the Harden family is now assured.

After an early meeting of the Trustees a further announcement will be made in this Journal.

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#### THE ROYAL ARMY MEDICAL CORPS ASSOCIATION.

A retired Regular Quartermaster or W.O.I (including W/S rank) is required as Secretary, R.A.M.C. Association.—Write 85, Eccleston Square, S.W.1.

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Authors are alone responsible for the statements  
made and the opinions expressed in their papers.

# Journal of the Royal Army Medical Corps.

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## *Original Communications.*

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### FRUSTRATION AND AGGRESSION

(A STUDY OF FRUSTRATION IN RELATION TO ARMY LIFE).

By Captain J. A. C. BROWN,

*Royal Army Medical Corps,  
(Graded Psychiatrist).*

[Received May 14, 1945.]

ARMY psychiatrists are often perplexed when they attempt to fit individual cases into the descriptions of the official nomenclature; for a large number of their patients are suffering not so much from neurotic illness as from neurotic behaviour, in which the environment plays a much larger part than the endogenous factor. It is generally accepted that neurosis is based on mental conflict, but one can distinguish between a group of cases in which the conflict is internal, that is between the individual's desires and his moral beliefs, and a second group in which the conflict is between his desires and a thwarting environment. The former group corresponds to what one might call true or classic neurosis; the latter, in which the individual is frustrated by his environment, is the type of case which will be dealt with here.

It need hardly be said that no hard and fast line can be drawn between the two types, for the classical case of neurosis is responding to environmental difficulties, and in the other type there are endogenous factors causing the intolerance of frustration. The main point, however, is that there is a vast difference between the man whose desires are in conflict with his own moral code, and the other who feels that his reasonable desires are being thwarted by an unjust society.

It is a matter of everyday experience that frustration results in aggression. This has been referred to by many writers, but the classical description of its results is due to Sigmund Freud. Freud considered that frustration was produced when the pleasure-seeking, pain-avoiding mechanism was blocked and that aggression was the "primordial reaction" to this state of affairs. In addition, he pointed out the two methods of dealing with this aggression (other than frank expression), namely, turning inward under a threat of punishment

and displacement on to a substitute object. Cyril Burt in "The Subnormal Mind" describes these two forms of response as the inhibitive and aggressive respectively. An example from everyday life is the man who, when "told off" by his employer whom he fears, responds either by a state of sullen resentment (inhibitive response) or by coming home and "taking it out of" his wife (aggressive response). The direct response would, of course, be to tell his employer what he thinks of him but this desire is frustrated by fear of losing his job or perhaps by his own temperament.

Frustration may be somewhat artificially divided into the type induced during early training to enable the child to conform to the usages of civilized life and the later thwarting incidental to human existence. The former is characterized by control of bowel, bladder, and sexual functions, and the elimination of inappropriate emotional responses. Its commands are finally accepted by the individual and become part of his moral beliefs (in Freudian terminology, they become introjected as the super-ego). The other type, on the contrary, is often felt by the individual to be irksome and unnecessary and is not willingly accepted by him. For instance, the frustration of the man who wishes to get married and cannot afford to, or the above example of the employee who has to submit to the anger of his employer.

A state of war produces considerable modifications in the latter group; for there is a considerable number of people who for the first time, perhaps, find their energies appropriately directed and their work considered important to society. Restrictions may increase, but their purpose is usually evident and the blame can be placed on a common enemy rather than the State. On the other hand, for the soldier, new sources of frustration arise, the main ones being the conditions of Army life and separation from home. In front-line service the aggression produced can be directed against a visible enemy and, in any case, less frustration exists, because the reasons for restrictions are apparent. At the Base, however, where the reasons are less evident and the opportunities for direct release of aggression do not exist, it is more liable to be directed along the lines of least resistance; against substitute objects or against the soldier himself. Paradoxically as it may seem, the Base area soldier has, for this very reason, often a more difficult psychological problem to face than the man in the front-line. Where there is no danger to share, the tendency is for group spirit to dissipate rather than increase, and the powerful help of morale is thus lost.

It is in this atmosphere that states of frustration (or, in ordinary language, demoralization) arise and may appear before the psychiatrist. They are not true neuroses or anxiety states for: (1) they show, in the pure form, no endopsychic conflict; (2) they show no true depression; (3) they can only be "treated" by altering the environment.

Although these states are due to frustration, it would be wrong to think that they are conditioned by that alone. The additional factors are numerous and may be divided into endogenous and exogenous. Taking the endogenous factors first, the impression is that intolerance to thwarting, though it may be due partly to an inherently inadequate constitution, is largely due to developmental causes. Many of the cases seen have been spoilt children who were "fussed over" in childhood and too readily got their own way. Such individuals naturally retain a dislike of not having their desires satisfied. On the other hand it is, in my opinion, quite incorrect to label all these cases as chronic or constitutional neurotics; many of them are, but a large number show no sign whatever of previous neurotic symptoms in the narrower sense of the word. In a series of 100 recorded cases, 46 men considered that they had never previously been neurotic or nervous in the sense of having specific symptoms such as phobias, anxiety, sleep-walking, or bed-wetting. In other words, a large number show traits which are rather psychopathic than neurotic, that is, traits which show in the sphere of social relations rather than in discomfort to the patient himself. Incidentally, in a psychiatric hospital, one is perhaps too prone to accept the fact of a neurotic constitution as being, in itself, an adequate explanation of a patient's breakdown in Army life. Some of us who have been R.M.O.s cannot help feeling that this has become somewhat of a myth. Nobody would deny that there are certain inadequate people who are hardly able to stand

up to any stress, however slight, but on the other hand few men would be found to be entirely free from neurotic symptoms. To assume that these are the main causes of neurotic breakdown in the Army is unjustifiable. When the psychiatrist goes out and studies men in their units he finds large numbers with fairly severe symptoms who carry on with their work and never report sick at all. Not only that, but an appreciable number admit that they have improved or have even lost original symptoms while in the Army. One of the neurotic's main needs, the need for certainty, and security in the group, is, indeed, found *par excellence* in the Army.

After this brief digression, we come to the exogenous factors causing frustration to develop into demoralization. There are many, but the main ones are: home worries, lack of education, bad unit morale and the existence of the possibility of escape. The effect of home worry need hardly be discussed as its effect is evident. Lack of education, on the other hand, may be felt to be a rather academic point. But education is of the utmost importance, for without it men lack a sense of purpose. It is tiresome to be on a detachment in the desert under any circumstances, but if the soldier does not know why he is there, how this particular job fits into the scheme of things and how it aids the conduct of the war in general, it soon becomes intolerable.

Morale, too, is of fundamental importance. It may be defined as the feeling that others are fighting or tolerating difficulties along with oneself; that one's own weakness is capable of being controlled by the group of which one is a member. Strict discipline, if intelligently applied, is helpful, because it produces this feeling; slack discipline, on the other hand, throws the individual on his own resources. The existence of a psychiatrist, with knowledge and desire to help and give advice, is excellent, but the existence of a psychiatrist, thought of as someone who can send a worried man home, is not only not helpful but even unkind. To the worried but conscientious soldier it is like eating a sumptuous meal before a starving man. The attitude of some men with home worries, "If my application for compassionate posting is turned down, I can go to a psychiatrist and he will send me home," is bad for morale, for it puts undue strain on the man who tries to do his bit in the face of difficulties. He is being tantalized. In addition, it creates in the man who is being sent home the impression that he is ill, which is not true. Thirdly, though of less importance, it leads the psychiatrist to give false diagnoses and use indiscriminately such terms as "Psychopathic personality," "Anxiety state," and "Depression."

The existence of the possibility of escape is of immense importance. It has been said that the neurotic requires certainty. If he is told "You will stay three years in this station and that is that," he will not like it (who does?), but he will not be perplexed and he will submit to the inevitable.

Corresponding to the two types of response described by Burt as aggressive and inhibitive, we have two clinical types already labelled and recognized by the soldier under the titles of "bloody-minded" and "browned-off." The former is resentful, intolerant of discipline, and aggressive to his superiors in rank. Nothing done for him is satisfactory, and education schemes or entertainment are just "propaganda." When there has been some repression of aggressive feeling, the condition may develop into the psychiatrically more serious one where there are outbursts of rage over trivial causes, lack of sociability, and very commonly the man may get really alarmed by his internal tension producing a feeling of "something going to burst inside." This latter state, where insight into the true cause of his state is being lost, is obviously approaching the true neurosis. In the inhibitive or "browned-off" type, the well-known picture is produced of lack of interest, apathy and sullenness. This type, again, if not taken in hand early, may develop into a more pathological state. The man becomes withdrawn, loses interest in his appearance, and sullenly repeats his request to be sent home. No discussion or argument makes the slightest impression when a man has regressed to this level.

It is of interest to note that primitive peoples may, by frustration of the above type, regress to almost incredible degrees, and appear to be actually psychotic. The Arab illiterate may be in a state of frenzy, and apparently maniacal when thwarted, for instance by being

locked in a detention cell. Or he may lose all social behaviour, crawl on the ground, smear himself with faeces or drink urine. When asked questions, he will give absurd answers or be completely mute. Many such cases were initially diagnosed as mania or schizophrenia, but removal from the thwarting environment results in almost immediate recovery. The same naturally applies to all states due to pure frustration.

The treatment and prophylaxis of the frustration syndrome has already been inferred in the discussion above. When the state has proceeded for any length of time or has attained any depth, it is doubtful if anything can be done other than disposal through psychiatric channels. Unless they are in this hopeless stage when first seen such cases should never be sent to a psychiatric hospital. The prophylaxis as suggested consists in attention to the man's personal worries, good unit education, facilities for sport and recreation and firm but just unit discipline. By the unit M.O. the subject should be treated as a human rather than a medical problem and, if a psychiatrist is to be consulted, it should be as far as possible from the atmosphere of a hospital, and with the understanding that the man is sent purely for advice. It should be emphasized that the treatment is to stop conflict by making it clear that no evasion is possible. Home worries must be referred to S.S.A.F.A. and the question of compassionate posting considered, if at all, as purely a welfare one, the decision of which is to be accepted as final. It must be remembered that the main thing is to avoid opening avenues of escape unless it is intended to go all the way. Such an avenue, once opened, can never be closed, and is demoralizing to the soldier if not implemented. Essentially, however, the problem is a unit one and such cases rarely occur in an atmosphere of good morale.

I am grateful to Colonel O. J. O'Hanlon for his interest in this subject and for permission to forward this paper.

## A BRIEF REPORT ON TWENTY-SIX CASES OF BUBONIC PLAGUE WITH THE RESULTS OF TREATMENT.

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THE purpose of this brief report on 26 cases of bubonic plague is to give the results of treatment and to show that the disease may have a relatively low mortality if diagnosed early and treated adequately. The cases occurred in the M.E.F. and were mostly treated at a special centre in a military hospital. The series comprises 12 Indians, 6 East African natives, 5 British, 1 Italian, 1 "Cape Coloured," and 1 European Jew.

Before the appearance of buboes the patients were usually prostrated with a sudden severe febrile illness resembling typhus or septicæmia. 23 developed buboes and the diagnosis was made by positive gland punctures in 19 and by positive blood cultures in 4 cases. In four with buboes gland puncture was negative which was attributed to the fact that sulphapyridine had been given prior to gland puncture. In the writer's experience gland puncture becomes negative after twenty-four hours of sulphapyridine therapy, even when a positive result has previously been obtained.

In three cases the diagnosis was made on clinical grounds alone and no buboes developed. These were Indians, from a small closed community, who became severely ill with sudden prostrating fever during a small epidemic of plague and the prompt treatment received may have prevented the development of buboes.

In 23 patients with buboes, the swelling was single in 18, being inguinal in 7, femoral in 7, cervical in 3 and axillary in 1. In 5 cases with multiple buboes, 2 had bilateral inguinal swellings, 2 femoral and iliac, and 1 femoral and inguinal. Suppuration of the bubo occurred in 8 cases (33 per cent). Fortunately, the iliac buboes, which attained the size of an orange, subsided without suppuration. 8 patients had palpable spleens and 4 developed a hæmolytic anæmia for which sulphapyridine may have been partly responsible. A leucocytosis was the rule, the average initial white cell count being 14,626 per c.mm. with approximately 82 per cent polymorphs; the highest count was 29,000 and the lowest 4,400.

*Treatment.*—Five patients had sulphapyridine alone, 18 sulphapyridine combined with anti-plague serum, 1 serum alone, and 2, in whom the diagnosis was made late, died before any adequate treatment could be given.

There were 5 deaths (19.2 per cent). Of the 5 treated by sulphapyridine alone, 1 died; of the 18 treated by sulphapyridine and anti-plague serum 2 died; the remaining 2 deaths occurred before treatment could be given.

Of 12 Indians, 4 died, but 2 received no adequate treatment. The "Cape Coloured" patient died but there was no mortality amongst the European or African cases. Details of treatment and clinical features are tabulated. The total quantity of sulphapyridine given averaged 30 to 45 grammes per case, and the dose of serum 155 c.cm. Serum was given as an initial dose of 10 c.cm. intravenously and 20 c.cm. intramuscularly, this being repeated at twelve-hourly intervals as long as necessary.

The cause of death in fatal cases was toxæmia and myocardial failure. Two deaths occurred suddenly and unexpectedly in patients who had become afebrile and who appeared to be out of danger. Unfortunately they refused to remain in bed as ordered and died, pre-



sumably of sudden cardiac failure or paralysis, just as may happen occasionally in the late stages of diphtheria.

Plague patients require complete rest which should be enforced as strictly as in diphtheria. One fatal case with a large cervical bubo had marked dyspnoea and stridor eventually necessitating urgent tracheotomy, during the performance of which death occurred. The prognosis is worst in cervical and best in inguinal buboes.

As a result of experience in these cases I am in no doubt of the efficacy of sulphapyridine and anti-plague serum, either singly or in combination, in the treatment of plague.

Case	Race	Age	Disease	Plague vaccine	Treatment	Spleen	Complications	W.B.C.	Result	Remarks
A.	Indian	20	Bubonic plague. L. cervical	Nil	M & B 693 3 g.	+	—	9,200/c.mm. P. 76%	Died	Suspected of plague as soon as bubo appeared but it was too late. Blood culture taken during life showed <i>B. pestis</i> and gland puncture post-mortem showed <i>B. pestis</i>
B.	Indian	27	Bubonic plague. R. cervical	Nil	M & B 693 55 g. A.P. serum 240 c.cm.	—	Cardiac failure	15,000/c.mm. P. 75%	Died	Afebrile and pulse-rate 80 for most three days. Would not stay in bed and died suddenly when he appeared to have recovered. He had shown a marked response to treatment adopted. <i>B. pestis</i> isolated from gland puncture
C.	Indian	27	Bubonic plague. Bilateral inguinal	Nil	M & B 693 49 g. A.P. serum 300 c.cm.	+	—	4,400/c.mm. P. 58%	Cured	Was very ill. Bronchitis signs marked. Looked septicæmic. Excellent response to treatment
D.	Indian	22	Bubonic plague. L. axilla	Nil	M & B 693 28 g. A.P. serum 60 c.cm.	—	Neck rigidity + cerebral symptoms + C.S.F. normal. Pneumonia L.L.	12,800/c.mm. P. 88%	Died	A Sikh who turned his face to the wall from the beginning. He spat out all the M & B 693 that he was given. Treatment instituted late. When first seen looked like a case of meningitis or septicæmia. Blood culture sterile. <i>B. pestis</i> isolated from gland puncture
E.	Indian	22	Bubonic plague. R. femoral	Nil	M & B 693 63 g. A.P. serum 330 c.cm.	—	—	24,000/c.mm. P. 81%	Cured	Very seriously ill but treatment instituted very early in the illness. Looked septicæmic. Blood culture sterile
F.	Indian	22	Plague. Clinical	Nil	M & B 693 56 g. A.P. serum 320 c.cm.	—	—	22,000/c.mm. P. 83%	Cured	Rapid onset of very severe illness. Treatment adopted at once. Blood culture sterile. Believed that early and adequate therapy prevented appearances of buboes
G.	E. African native	?	Bubonic plague. R. femoral, R. inguinal R. iliac	Nil	M & B 693 44 g. A.P. serum 30 c.cm.	+	Superficial buboes suppurated, iliac bubo resolved	29,000/c.mm. N. 78%	Cured	Multiple bubo formation. Suppurating buboes left to rupture spontaneously and evacuated themselves. Name was on D.D. List. <i>B. pestis</i> isolated from gland puncture
H.	Indian	30	Bubonic 2 days previously plague, R. inguinal	Nil	M & B 693 46 g. A.P. serum 245 c.cm.	—	—	19,000/c.mm. P. 90%	Cured	Very ill but rapid response to treatment adopted. 36 to 48 hours before appearance of typical bubo
I.	Indian	21	Bubonic plague. L. femoral	Nil	M & B 693 45 g. A.P. serum 380 c.cm.	—	Cardiac failure	18,000/c.mm. P. 84%	Died	Afebrile and average pulse-rate of 70 for five complete days, when he died suddenly and unexpectedly when he seemed to have recovered. He would not stay in bed. <i>B. pestis</i> isolated from gland puncture
J.	Indian	30	Plague. 2 days previously Clinical	Nil	M & B 693 35 g. A.P. serum 150 c.cm.	—	—	13,000/c.mm. P. 76%	Cured	Very early institution of treatment at onset of severe fulminating illness no doubt prevented appearance of buboes. Blood culture sterile

Case	Race	Age	Disease	Plague vaccine	Treatment	Spleen	Complications	W.B.C.	Result	Remarks
East African native		25	Bubonic plague. R. femoral. R. iliac	Nil	M & B 693 35 g. A.P. serum 90 c.cm. Blood transfusion. Glucose saline i.v. Sulphathiazole 65 g.	+	(i) Secondary Septicæmia (ii) Hæmatoporphyria. (iii) Hæmolytic anæmia. R.B.C. 2.2 mil/c.mm. Hb. 40%. Reticulocytes 11%. Albumin and urobilinogen ++ in the urine. Icteric index 10. (iv) Superficial bubo suppurated	11,600/c.mm. P. 85% Later W.B.C. 43,000	Cured	Blood culture revealed <i>B. pestis</i> as did gland puncture. Hæmolytic anæmia due to sulphapyridine or plague either singly or in combination, but more likely to the sulphapyridine. ? increased tendency to hæmolysis in case receiving serum and sulphapyridine at same time. Was on D.I. List
Indian		19	Plague. Clinical	3 days previously	M & B 693 40 g. A.P. serum 150 c.cm.	—	—	9,600/c.mm. P. 62%	Cured	Rapid onset of severe febrile illness. Immediate institution of treatment. Blood culture sterile
Indian		25	Bubonic plague. L. inguinal	5 days previously	M & B 693 32 g. A.P. serum 210 c.cm.	—	—	12,000/c.mm. P. 71%	Cured	Very seriously ill case. Looked septicæmic at onset. Blood culture sterile. Treatment instituted twenty-four hours before typical bubo appeared
Indian		22	Bubonic plague. L. femoral	Nil	M & B 693 Nil A.P. serum 180 c.cm.	—	—	15,000/c.mm. P. 78%	Cured	Immediate response to anti-plague serum alone. <i>B. pestis</i> isolated from gland puncture
German Jew (Pal.)		19	Bubonic plague. R. femoral	3 weeks previously	M & B 693 40 g.	—	—	19,000/c.mm. P. 81%	Cured	Clinically mild. <i>B. pestis</i> isolated from gland puncture
U.K.		—	Bubonic plague. R. femoral	Jan. '44 5 months previously	M & B 693 40 g.	+	—	7,700/c.mm. N. 66%	Cured	A very mild case, ? due to protection afforded by plague vaccine five months previously, possibly aided by racial resistance. <i>B. pestis</i> isolated
Italian P.o.W.		30	Bubonic plague. R. inguinal	Nil	M & B 693 40 g.	—	Bubo suppurated	26,000/c.mm. N. 84%	Cured	Mild case. <i>B. pestis</i> isolated from gland puncture
Cape Coloured		44	Bubonic plague. R. cervical	Nil	M & B 693 19 g.	—	Hæmoptosis. ? mediastinitis. Cardiac failure	Not performed	Died	Marked inspiratory and expiratory dyspnoea with stridor for which tracheotomy performed without anaesthesia during which patient died. <i>B. pestis</i> isolated from gland puncture
U.K.		31	Bubonic plague. Bilateral inguinal	Nil	M & B 693 30½ g.	—	Secondary septicæmia	7,300/c.mm.	Cured	Was on S.I. List. Blood culture showed <i>B. pestis</i> as did gland puncture
U.K.		31	Bubonic plague. R. inguinal	Nil	M & B 693 18 g. A.P. serum 50 c.cm.	—	Hæmoptysis. Papular rash on trunk and limbs. Bubo suppurated	Not carried out	Cured	Was on D.I. List. <i>B. pestis</i> isolated from gland puncture.
U.K.		24	Bubonic plague. R. femoral. R. iliac	Nil	M & B 693 39 g. A.P. serum 70 c.cm.	+	Superficial bubo suppurated	17,400/c.mm. P. 79%	Cured	<i>B. pestis</i> isolated from gland puncture
U.K.		22	Bubonic plague. L. inguinal	Nil	M & B 693 39 g. A.P. serum 40 c.cm.	—	Bubo suppurated	14,200/c.mm. P. 74%	Cured	<i>B. pestis</i> isolated from gland puncture
East African native		24	Bubonic plague. R. femoral	2 days before reporting sick	M & B 693 55 g. A.P. serum 30 c.cm.	+	(i) Superficial bubo suppurated (ii) Hæmolytic anæmia. R.B.C. 3.72 mill. Hb. 60%	8,200/c.mm. P. 81% Later W.B.C. 16,000/c.mm.	Cured	Was on D.I. List. Blood transfusion not given. <i>B. pestis</i> isolated from gland puncture

Case	Race	Age	Disease	Plague vaccine	Treatment	Spleen	Complications	W.B.C.	Result	Remarks
X.	East African native	24	Bubonic plague. L. femoral	Nil	M & B 693 51 g. A.P. serum 60 c.cm. Blood transfusion	—	(i) Bubo suppurated (ii) Hæmolytic anæmia. R.B.C. 1·96 mill. Hb. 35%	14,000/c.mm. P. 84% Later W.B.C. 32,800	Cured	Was on D.I. List. <i>B. pestis</i> isolated from gland puncture
Y.	East African native	?	Bubonic Plague. L. inguinal	Nil	M & B 693 31 g. A.P. serum 60 c.cm. Blood transfusion, Continuous drip, Glucose saline i.v.	—	(i) Hæmatoporphyrinuria (ii) Hæmolytic anæmia. R.B.C. 2·8 mill. Hb. 50%	10,000/c.mm. P. 80%	Cured	Was on D.I. List. Blood culture positive and <i>B. pestis</i> also isolated from gland puncture
Z.	East African native	30	Bubonic plague. R. femoral	14 days before admission	M & B 693 34 g. A.P. serum 30 c.cm.	+	—	Not carried out	Cured	A mild case. ? result of recent exhibition of plague vaccine

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## VENEREAL DISEASE CONTROL IN EAST AFRICA COMMAND.

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THE purpose of these notes is to outline the various aspects in which the incidence, prevention and treatment of venereal diseases in this Command differ from the conditions obtaining in other Commands.

### A. INCIDENCE AND PREVENTION.

#### (1) *General Considerations.*

(a) *Type of Soldier.*—The overwhelming majority of soldiers in this Command are locally recruited Africans mainly from Kenya, Uganda, Tanganyika, Nyasaland, and the Rhodesias. With men collected from such a vast area, widely differing in customs and modes of life, it is naturally difficult to generalize and the ensuing remarks are therefore only generally true.

The greater number of these men originate from country districts where they have lived, prior to enlistment, in conditions in which the direct influence of Western civilization has been slight. Brought up in the traditional life of their ancestors, they are often completely illiterate and extremely ignorant of the medical and scientific facts that are common knowledge to most Europeans. They are, however, very often eager, though not very quick, to learn and their knowledge, lacking background, is often superficial and easily forgotten. One important product of this ignorance is an extremely casual attitude to venereal disease. Gonorrhœa, syphilis and chancroid are recognized and named in the native languages. They are regarded as comparatively trivial, completely unassociated with late effects; sometimes indeed their venereal origin is not realized.

Christianity, often of a rather primitive type, is professed by some 60 per cent of the total, though here again its precepts are not always deeply ingrained. Of the remainder, a fair number are Mahomedans and the greater proportion Pagan.

In normal tribal life, sexual customs and morality are the subject of very strict rules which are scrupulously observed. That is not to say that tribal rules necessarily resemble closely the sexual morality derived from Christian ethics; in some circumstances and in some tribes, extra-marital coitus is freely allowed. But, whatever the practices, they are closely controlled by custom and law.

The advent of Christianity and Western civilization has already, to some extent, weakened tribal control particularly where tribal law has been at variance with normal Christian moral standards.

The African soldier, removed from direct tribal influence for long periods and being in a Unit with members of other tribes, tends to pay still less regard to the strict code of his fathers and the standards inculcated by his British teachers are liable to be less deeply ingrained than the ones they replace. He is therefore at present going through a difficult stage of transition which makes him particularly susceptible to influence, either for good or for evil.

In spite of the weakening of tribal tradition, however, two ancient loyalties remain of very great importance. These are to the family and to the tribe. In all but a very small proportion the production of a large and healthy family and the welfare of the tribe are given

the highest importance. Impotence or sterility consequently is a disaster greatly to be feared.

Discipline and loyalty to British Officers and N.C.O.s are often of a very high order. They tend very much, however, to be of a personal kind and once the African is away from the officers he knows the influence of strange officers is liable to be very much less.

(b) *Availability of Women.*—The weakening of tribal law is generally less among women than among men. There are, however, notable exceptions and a few tribes are notorious for the high proportion of their women who become prostitutes and wander widely over the country plying their trade. In some places it is common for women to act as occasional prostitutes within their own tribal area; whole-time prostitutes, however, usually practise their profession outside their own areas, frequently concealing their origin. Their standard of living is low, so that the soldier with a few shillings in his pocket constitutes an enormous temptation. Generally speaking, prostitution, whether habitual or occasional, is not looked upon as a grave social or moral misdemeanor and consequently prostitutes are not the despised outcasts they are in Europe nor are they so frequently associated with other forms of vice. Although, in most tribes, prostitution is frowned upon by the elders and in some punished very severely, there are others in which a few years of prostitution is a common precedent to marriage, the bride having the advantage of the money she has earned. On account of the variability of tribal custom and of the extent to which it is observed and of economic conditions, the numbers of prostitutes in different places vary enormously.

(c) *Distances.*—The Command is large, extending from north to south over a distance of more than 2,000 miles. Journeys are made in trucks on sometimes indifferent roads, by rail or by lake steamer or a combination of these. An African soldier going on leave or posted to another Unit may be several weeks on the journey and during that time seldom can be kept under close disciplinary control. For this reason short periods of home-leave are not usually allowed; normally one month's leave is granted per annum, and for this purpose the soldier may be away from his Unit as long as three months. The inevitable isolation of some Units has made welfare extremely difficult, particularly the provision of entertainments and films. All these results of the large size of the Command have increased the tendency to illicit intercourse.

(d) *Frequency of V.D. among Civilians.*—The few actual comprehensive statistics available on this point relate to very localized areas and the position over the country as a whole is difficult to assess. In one District (Gilgil, Kenya) routine examinations of prostitutes showed about 63 per cent gonorrhœa and 56 per cent syphilis [1]. In another part (Gigiga, Ethiopia) examination of prostitutes revealed V.D. "about 100 per cent." A civilian doctor in a third area (Mogadishu district, Somaliland) estimated for the whole population 70 per cent syphilis, 40 per cent gonorrhœa and 15 to 20 per cent chancroid, with 30 per cent of all births stillbirths due to syphilis [2]. In yet another area (Coastal Tanganyika) chronic gleet was said to be "almost ubiquitous" [3]. These figures all relate to areas in which heavy infection is to be expected. In remote country districts the incidence is doubtless much less. Owing to the small size of the civil medical service in proportion to the immense amount of work to be done, large-scale routine examinations are almost impossible and as far as I know have not been carried out.

It is known, however, that a few tribes are showing a declining birth-rate and the reason for this is believed to be the sterility resulting from venereal diseases. It seems clear that among the section of the civil population practising regular or casual prostitution the incidence of syphilis, gonorrhœa and chancroid is very high indeed. It is widely believed by the civil medical authorities that the incidence of V.D. is increasing among the civil population as a whole and it seems evident that, unless care is taken to avoid it, the returning soldier will accelerate the increase.

Lymphogranuloma inguinale appears to be comparatively uncommon and almost entirely limited to the coastal areas.

In assessing the incidence of syphilis, considerable difficulty arises owing to the widespread

occurrence of yaws in many districts. In the active stages the differential diagnosis between these two diseases may be difficult enough, depending as it does on purely clinical features. There is plenty of scope for diversity of opinion as to the relative frequency of these diseases in communities where both are known to exist. But the difficulty which arises in the assessment of the significance of positive Kahn reactions in the blood in the absence of unequivocal clinical signs of either yaws or syphilis may well be insuperable. In most districts yaws has been stamped out as a result of intensive campaigns against this disease. It must, however, be understood that the treatment usually given in such a campaign is such as to heal primary and secondary yaws and thus prevent the spread of infection. It is not usually sufficient to bring about a genuine complete cure; positive blood Kahn reactions probably persist for years in very many cases and, in districts where early yaws used to be endemic, the skin and bone lesions of tertiary yaws are frequently seen in older people.

(e) *The Legal Position.*—In the territories under British sovereignty the laws regarding prostitution, procuring, medical examination and treatment of infected persons closely resemble, or are identical with, those in force in U.K. The individual of whatever race has the same rights in respect of arrest and detention by the police. Regulations on the lines of those in force in U.K. under the Emergency Powers Act are in force in some territories.

Difficulty arises in two respects: first in the inadequacy of the police forces in many districts to take on additional work and, second, in the depletion of the civil medical service owing to the war, making it very difficult or impossible for the examination and treatment of infected women to be carried out on a large scale.

In occupied Italian territory, Italian law holds good for the most part in respect of prostitution. Prostitutes are licensed and subject to periodical examinations and, if necessary, compulsory treatment. Here again, depletion of police and medical personnel result in incompleteness.

## (2) *Statistics of Incidence.*

During 1940 the incidence of all V.D. over the whole Command, taken month by month, was in the region of 80 per 1,000 per annum. This figure fell gradually to 48 per 1,000 per annum in the early part of 1941 but thereafter rose continuously to 180 per 1,000 per annum at the beginning of 1943. This period of rise coincided roughly with the period of the East African and Abyssinian campaign and the subsequent return of troops to British East Africa. The incidence remained with minor fluctuations around from 150 to 170 per 1,000 per annum throughout 1943. After a peak of 204 per 1,000 per annum in March, 1944, it fell again and from May to August, 1944, has been about 140 per 1,000 per annum. It is as yet too early to say whether the recent downward trend will be continued. The incidence varies a great deal in different regions, some districts having a rate more than three times greater than that given for the Command as a whole.

As a rough indication of the relative frequency of various diseases it may be said that the proportion is about syphilis 1, gonorrhœa 3·5, other V.D. 3. In the last group the great majority of cases are chancroid. Lymphogranuloma inguinale is not common. Granuloma venereum occurs very rarely, if at all.

A high proportion of cases, probably about 40 per cent, occur in men who are on leave. Infection may be contracted on the outward journey or on the return journey. Having regard to the relatively small proportion of men on leave at any one time, this indicates a ratio of incidence in leave personnel many times that of men serving with their Units. The extent to which infection is acquired from wives while on leave is problematical. While this is alleged by the patient in a small proportion of leave infections, examination of the wives in question has not always confirmed it. The high rate of incidence among leave personnel may certainly be attributed in large measure to the exceptional temptations which exist along the travel routes. It is unavoidable that men travelling on these routes are not always subject to close disciplinary control. The importance of direct disciplinary control and man-management is further evidenced by a comparison of incidence in Units stationed in the same areas. In general, Units where man-management is made an important

part of training and strict control possibly show a far lower incidence of V.D. than some technical Units where vocational training claims more attention and transport Units where men are necessarily away from the Unit for a large proportion of their time.

### (3) *Prevention.*

While, of course, the prevention of V.D. remains ultimately the responsibility of Officers and N.C.O.s in command of troops, the medical branch has given and continues to give a lot of attention to this matter. Before the appointment of a Command Venereologist, this was delegated to the A.D.H. and since that time the Command Venereologist and A.D.H. have collaborated.

(a) *The prevention of promiscuity* has been placed first in the prophylaxis of V.D.

(i) *Welfare.*—Emphasis is constantly laid on the importance of welfare; the Command is, however, relatively small in numbers and is not a theatre of active operations, so that in the matter of supplies the same priority as some other Commands is hardly to be expected. Cinema entertainments are seldom possible more than once weekly and live concert parties are rare. The large distances between Units contributes to this shortage. The building of canteens is sometimes difficult owing to labour shortages and building economies. The result is that these branches of welfare are opening up slowly.

(ii) *Education.*—Talks on V.D. are given fortnightly in most Units and more frequently in some. A Current Affairs issue has been published dealing almost exclusively with this subject. A small illustrated booklet "Hatari ya Malaya" ("Dangers of Prostitutes") has also been printed and widely circulated. This booklet consists of photographs of actual cases showing the early and late effects of V.D. and contains information regarding prevention. It is printed in Swahili and Chinyanja, the two main languages. Coloured posters illustrating the family and social effects of V.D. have been produced and distributed for exhibition in recreation rooms, canteens, etc. Articles appear regularly in the vernacular newspapers printed for the troops and V.D. is also dealt with in the Swahili broadcasts from Nairobi. The prime object of this publicity is to make known the late effects of V.D. with particular reference to the repercussions on family and tribal welfare.

British personnel are being reached through the medium of East Africa Command Fortnightly Review. All the publications have been made by the Publications Department of the Directorate of Education and Welfare in collaboration with the Medical Branch.

(iii) *Religion.*—The S.C.F. has written to all his Chaplains on the subject, and continues to take an active interest in the moral aspects of the problem.

(iv) *Example.*—The example set by British Officers and N.C.O.s is of the greatest importance to the African whose tendency to imitate the white man can well be imagined. The importance of example and the responsibility which we owe to the natives of these countries is constantly emphasized, both in lectures and written articles.

(v) *Hygiene Training.*—Courses for Regimental Officers and British N.C.O.s in Unit Hygiene are conducted about fortnightly. V.D. prevention occupies three hours of an eight-day course.

(b) *Chemical and Mechanical Prophylaxis:* (i) *Preventive Ablution (E.T.).*—It is explained that E.T. must take second place to the prevention of promiscuity.

E.T. Rooms are established in all camps. A certain number of "central" E.T. Rooms are already in strategic positions in towns and villages and it is intended to increase their number in order to facilitate promptness in carrying out ablution. The usual rule is that all men returning from pass are asked whether they have risked infection. If so, E.T. is compulsory. Records are kept, and any man developing fresh V.D. who has not used E.T. about the time of exposure is liable to be punished. In a few Units all men returning from pass are compelled to use E.T. but this rule is discouraged. Unit E.T. Rooms are staffed by an orderly trained by the Medical Officer, and an illustrated poster 3 feet by 2 feet is exhibited detailing the method. Instruction in the technique and value of E.T. has been included in the syllabus of all recruit training.

The staffing of Central E.T. Rooms has given rise to some difficulty but this is being solved by a War Establishment for the purpose which has recently been approved.

In all cases, E.T. is done with soap and water, permanganate solution and calomel cream. Sulphonamides have not been used for prophylaxis in this Command.

(ii) *Condoms*.—These are not normally available for Africans. Africans are very unwilling to use them, both men and women; furthermore, it is thought that their ready availability would contain a suggestion and militate against the teaching of continence.

(c) *Early Diagnosis*.—Intentional concealment of V.D. is not very common. In order to detect cases as soon as possible, however, routine medical examinations are carried out.

(i) In all Units all men are examined every fortnight for evidence of recent V.D.

(ii) As far as possible all men passing through transit camps along lines of communication are examined for V.D. before being allowed to proceed. This has a particular importance for leave personnel, and it is hoped that this measure will help to prevent the spread of V.D. into the reserves. For the same reason men who have had V.D. are not allowed to go on leave until satisfactory treatment and observation have been completed.

(d) *Treatment of Civilians*.—In general, the civil medical services are not able to undertake the diagnosis and treatment of V.D. on a satisfactory scale. In a few places it has been possible for civil clinics for women to be opened and in doing this the Army has frequently helped with buildings and equipment. These clinics have, in virtue of their small size and rarity, been of doubtful value in reducing V.D. in the Army.

The tracing of contacts is attempted in every case but proves extremely difficult. Information sufficient to identify the woman is obtained in about 10 per cent of cases, but it may often happen that the civil police or medical authorities are unable to deal effectively with her.

While, therefore, efforts are made to trace and treat contacts it appears that in general no great reduction in military V.D. incidence can be expected from these methods.

The expulsion of women from the vicinity of camps and their compulsory medical examination is attended by similar legal and medical staff difficulties.

A Standing Committee has been formed in which are represented the Army departments of A.Q., Medical, Army Welfare and Provost and the corresponding departments of the civil governments. The function of the Committee is to recommend measures whereby V.D. may be fought, both to the military and civil authorities. Its effect has been to keep the problem constantly before all branches of the Services and civil government. It is largely as a result of its recommendations that Regulations permitting the compulsory examination and treatment of prostitutes have been introduced in most of the territories.

No brothels or similar organizations receive the connivance of, or any form of assistance from, the Army. The nearest approach to this is in occupied Italian Somaliland, where prostitution is conducted under police licence. A system was at one time in use in some places whereby women examined and found free from infection were given tickets. This has now been abandoned.

## B. TREATMENT.

### (1) *General Considerations.*

(a) *Distances*.—It has already been noted that the Command is large and that journeys may take a long time. It may further be mentioned that the outlying Islands are over 1,000 miles from the mainland ports. For this reason considerable decentralization is obligatory.

(b) *Shortage of Specialists*.—While there are many Medical Officers who have particular interests, and some with special experience, in venereal diseases, there are very few whose qualifications are recognized officially and who are consequently classified as venereologists. The inevitable result has been that individual standards of diagnosis and treatment have varied considerably. A further result is that cases have been dealt with as they arose in suitable medical units by General Duty Officers and the available equipment not always



demanding. Lastly, the absence of Specialist Officers has hampered the training of Special Treatment Orderlies, so that these are also comparatively few in number.

(c) *Shortage of British Personnel.*—In the medical services of this Command, British Other Ranks are only little more numerous than Medical Officers. While some African Orderlies are excellent, in general they need more supervision than British personnel and consequently increase the work of Officers and British N.C.O.s to some extent.

### (2) *System of Disposal of Cases.*

(a) *Special Treatment Centres.*—Two Special Treatment Centres are in existence, one in British Somaliland and one in Kenya.

The Special Treatment Centre, British Somaliland, has accommodation up to 500 beds. It adequately deals with all V.D. in British Somaliland and in troops stationed in the adjacent parts of Abyssinia.

The Special Treatment Centre in Kenya has accommodation for 2,000 patients. It deals with cases arising from the whole of Kenya and Uganda and the northern margin of Tanganyika. It is also possible for long-standing and inveterate cases to be transferred to this Centre from still more remote places. It would not be surprising if this very large Unit were too cumbersome. It is divided into four main sections, each of 400 beds, and a "hospital" section of 400 beds to deal with more serious cases and intercurrent diseases. As a result of careful organization and energetic administration it does, in fact, run very efficiently.

(b) *General Hospitals.*—Three General Hospitals within the collecting zone of the Kenya Special Treatment Centre are each able to accommodate from 40 to 60 V.D. patients. One of them deals with any form of V.D. and evacuates to the Special Treatment Centre when numbers rise above the normal working level. The other two hospitals generally treat only gonorrhoea and evacuate the remainder to the Special Treatment Centre.

(c) *Station Hospitals.*—Station Hospitals within the collecting zone of the Kenya Special Treatment Centre treat only gonorrhoea and evacuate all other V.D. to the Special Treatment Centre. In more remote parts, however, Station Hospitals are obliged to treat all cases. V.D. cases are dealt with by G.D.O.s who in most instances have some amount of special experience. Equipment is reasonably good and a very fair standard of work is usually achieved. The chief difficulties lie in the accurate diagnosis of venereal sores and chronic urethritis.

(d) *Sick Bays.*—Owing to distances between Units and their appropriate hospitals, most Units have Sick Bays. In these, gonorrhoea is treated by R.M.O.s with sulphonamide, provided diagnostic facilities are available. All sore cases and those cases of gonorrhoea which fail to respond to one course of sulphonamide are sent to a Special Treatment Centre or Station Hospital.

### (3) *Standards of Diagnosis.*

The frequency of chronic gleet and of yaws has already been the subject of comment. It will be evident that, even to the most experienced, considerable difficulties in diagnosis are likely to arise.

At the same time some relaxation of the standards usually adopted has been necessary. In dealing with acute fresh cases the normal standards are aimed at; the proper investigation and hospitalization of all cases of chronic gleet would, however, be a herculean task and is not embarked upon unless complaint is made or some other symptom manifests itself.

The impression is strongly gained that a positive blood Kahn reaction is of little diagnostic value. The tendency, in the absence of positive dark-ground findings, is to base a diagnosis of syphilis on a positive blood Kahn reaction in cases of venereal sore. Similarly, cases presenting a skin rash or other sign of obscure origin are sometimes diagnosed as syphilis because the blood Kahn is positive.

Positive Kahn reactions are, however, fairly common in the absence of history or signs

of yaws or syphilis, and it seems that only a negative reaction is of real value. For this reason, it has not been considered profitable to treat African patients with positive Kahn reactions in the absence of unequivocal evidence of active or recent syphilis.

It is difficult to elicit a satisfactory medical history from most of these men. There can be little doubt, however, that a substantial proportion of soldiers have had yaws in childhood and received sufficient treatment to suppress clinical manifestations, but not enough to return the Kahn reaction to normal.

#### (4) *Treatment.*

(a) *Gonorrhœa.*—At one time, owing to a temporary shortage of sulphonamides, the routine treatment consisted of small doses of sulphonamide given intramuscularly concurrently with intravenous T.A.B. This has now been almost entirely replaced by a sulphathiazole course of 20 grammes over four days (orally). The frequency of chronic gleet confuses the issue but in general it appears that primary drug-resistance in fresh gonorrhœa is not very common in this Command. Reports show that almost 80 per cent of cases are cured by one or two courses of the type described above. Sulphonamide resistance appears to be more common in British personnel and is perhaps due to the fact that sulphonamide can be bought on a "black market" in many places, and may therefore be used for prophylaxis or secret self-treatment. The price, bought in this way, is prohibitive for most Africans. It appears also that sulphonamide-resistance has to some extent a geographical incidence.

The recent introduction of penicillin will no doubt modify the situation considerably.

(b) *Chancroid.*—The treatment of chancroid calls for no special comment.

(c) *Syphilis.*—Syphilis has been treated by the usual system in use in the British Army. Owing to the frequency of defaulting it is usual for men to remain in hospital or Special Treatment Centre for the entire first course. A further modification is that normally two courses only are given to Africans for primary syphilis and three for secondary.

Complications have at times caused considerable concern. Jaundice has been occurring, notably at the Kenya Special Treatment Centre, for the past year and reached a peak during the past summer (1944) when about 17·5 per cent of all syphilitics in this Centre developed jaundice. This has now died down and has almost entirely ceased. On account of the high incidence of jaundice the dose of N.A.B. was lowered to 0·45 gramme weekly throughout the Command; it has now been raised to 0·6 gramme again. A second complication, which appears to affect almost exclusively men treated in the Kenya Special Treatment Centre, is a pyrexial thrombophlebitis affecting predominantly the veins of the legs. There is often considerable œdema, and such cases may need to be hospitalized for many weeks. A third syndrome of a fever which relapses without localizing signs has also been observed in patients treated in this Special Treatment Centre. This syndrome and that of thrombophlebitis have been extensively investigated in the General Hospitals by their medical staffs and, it is anticipated, will later be the subject of a special report.

The widespread adoption of penicillin treatment will, of course, revolutionize the situation, with results that it is as yet too early to assess.

#### (5) *Tests of Cure.*

The normal Army standards are aimed at. In view of the difficulties in diagnosis mentioned already, however, it is felt that cases need to be judged on individual merit, and that hard and fast standards are of somewhat limited use. It is considered that later on, with more experienced Medical Officers, judgment of the individual case will be of more value than adherence to set standards.

#### (6) *Follow Up.*

Large distances, scarcity of Officers and British N.C.O.s and the casual attitude adopted by the African towards his own disease and its treatment have all militated against satisfactory follow-up. It is hoped in the near future to modify the system of recording cases so as to make defaulting less likely.

(7) *Training and Use of Specialists.*

It is intended to increase the number of graded venereologists within the Command. In this way it is hoped to ensure the continuous employment of certain Medical Officers in this work and thus to improve standards of diagnosis, treatment and general handling of patients, co-ordination of work in the Command, and to increase the numbers of Special Treatment Orderlies. The War Establishment of the Kenya Special Treatment Centre provides for five venereologists, that of the Somaliland Special Treatment Centre for two. In addition it is hoped eventually to have graded venereologists at those General Hospitals and Station Hospitals where, in virtue of their isolation, considerable numbers of V.D. cases must be treated. With the incidence of V.D. as high as it is, there is no shortage of Medical Officers whose clinical experience is very large. By means of short intensive courses it is easy for some of these Officers to reach the standard of graded venereologists.

The Kenya Special Treatment Centre is used as a training ground for future venereologists and Special Treatment Orderlies, since in a Unit of this size the clinical material is, of course, very large indeed. As more specially trained personnel become available it will be possible, and probably desirable, to effect some further decentralization by establishing more Special Treatment Centres. Unless, however, the incidence of V.D. increases, this will presumably be at the expense of the existing Special Treatment Centres.

I am indebted to Brigadier R. P. Cormack, D.D.M.S., East Africa Command, for permission to forward these notes.

REFERENCES.

- [1] GIBSON, R. G., and PARK, R., June, 1943. *East African Medical Journal*, 20, 180.
- [2] PETROSSINI (Personal Communication).
- [3] YOUNG, W. A. (Personal Communication).

## NOTES ON THE SIGNIFICANCE OF FEVER IN SYPHILIS WITH A REFERENCE TO HYPOPYREXIA.

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If, as should be done, the temperature is taken and recorded regularly in cases of syphilis at all stages of the disease and of the treatment, a more or less raised temperature can often be demonstrated. It is possible that one patient in every six will present some thermal upset. Thermal upset may occur :—

- (1) With fever as one of the presenting signs and symptoms in some stage.
- (2) As hypopyrexia.
- (3) With fever as an indication of the reactivation of syphilis by various agents, either physical or chemical, i.e. "biotropism".
- (4) With fever from intercurrent disease which either arises *de novo* or is activated by the syphilis and/or its treatment.
- (5) With fever as a manifestation of intoxication by, or intolerance to, the drug used.

SYPHILITIC FEVER may occur (a) with eruption, i.e. "eruptive fever" and (b) without eruption or syphilitic fever properly so-called, or "essential fever".

This fever was thought to be very much more frequent in women than in men, especially in young women suffering from secondary syphilis, since this form of syphilis was regarded rather as the concomitant of young women.

However, experience in Abyssinia, the Somalias and East Africa, in treating more than 20,000 native male patients suffering from various types of V.D. has shown that secondary syphilis is very common amongst such natives and that raised temperature from different causes is far from rare amongst them, pointing to the importance of a correct interpretation of these pyrexias.

"*Eruptive Fever*".—By this is understood the fever which may precede and sometimes accompanies the eruptions or mucocutaneous manifestations of syphilis, especially in the secondary stage and particularly with roseola and the florid generalized papular eruptions.

There is a prodromal fever of 100° to 103° F. (cf. other infectious diseases), lasting four or five days, and falling almost to normal as the rash becomes marked.

This fever is at times associated with more serious manifestations such as iritis, periostitis, syphilitic pseudo rheumatism, adenopathy, etc.

"*Essential Fever*".—This is syphilitic fever properly so-called and used to be considered almost exclusive to females who were in their first months of the secondary stage of syphilis. There are three types of this fever :—

(i) *Intermittent*, which is the most usual and is apt to be confused with malaria, but shows daily exacerbations as opposed to the three or four day periodicity with apyrexial intervals of malaria.

There are feverish attacks of 101° to 102·4° F. with general malaise, shivering rather than rigors, and flushing and sweating usually in the evenings. Splenic enlargement is unusual or only slight and blood parasites are absent. Anti-syphilitic treatment causes cessation of the attacks.

There may be confusion with tuberculosis though, in the latter, the night sweats are more profuse.

(ii) *Continuous fever* may be moderate around 100·4° F. or intense around 102° to 104° F.

(rare), and may be accompanied by various symptoms including generalized muscle pains and gastric disturbance, suggesting typhoid and paratyphoid fevers. These latter are not uncommon in syphilitics in the secondary stage but, in a patient without marked gastric upset, in good general condition with a clean moist tongue suffering from this type of fever, syphilis must be considered.

This continuous fever rarely persists longer than six or seven days, but sometimes a true syphilitic fever lasts two or three weeks, or shows 2 or 3 plateaux each lasting about seven days. If there is asthenia, stupor, torpor or somnolence accompanying the fever, a syphilitic typhoid state might be mistaken for true typhoid.

These febrile forms of syphilis cannot, and must not, be diagnosed solely on clinical grounds. Laboratory aid, including blood culture and agglutination tests, is essential.

(iii) *Irregular fever* is a mixture of all types. First irregular, then continuous, then repeating an irregular mixture of the two types in a completely capricious manner, the beginning, the rise and the fall being altogether unpredictable. This irregular fever is not uncommon.

*Fever in Primary Syphilis.*—Milian has described a small series of 21 patients with primary syphilis but without inflammatory adenopathy, skin manifestations or other organic affection capable of producing fever, in whom noteworthy febrile reaction was remarked in four cases.

There was slight rise in temperature to 100° F.; no sweats and no rigors; apparently commoner in females; occurred a few days after the chancre appeared and particularly with multiple chancres, i.e. severe infection.

Even following a simple injection of mercury, these feverish primary syphilitics are liable to produce marked Herxheimers Reaction with a considerable further rise in temperature.

*Fever in Secondary Syphilis.*—This fever is recorded as a plateau around 100° F. and rarely more than 101° F. It may last for days or weeks if the appropriate drug is not given.

This fever may be launched, as it were, by the beginning of the exhibition of treatment and is, in these cases, the indication of the development of an important spirochaetal centre or focus which is usually visceral.

*Fever of Early Malignant Syphilis.*—This fever oscillates between 100·4° and 103° F., and may last a month. Usually there are morning remissions. The fever is frequently entirely uninfluenced by mercury but reacts to arsenobenzol and, in a patient riddled with ulcers, it might lead to the suspicion of secondary infection with other organisms were it not for the efficacy of treatment with arsenobenzol.

*Fever in Tertiary Syphilis.*—This occurs as in secondary syphilis, and there may be (i) continuous fever in the region of 102° F. for weeks, without noteworthy symptoms or with only discrete signs of syphilis. This type of fever without other flagrant cause is almost characteristic of the disease. (ii) Fever with gross oscillations when there is almost hyperpyrexia of 103° to 105° F. with enormous irregularities. This condition is often thought to be tuberculosis or due to infection with *B. coli*. Both liver and spleen may be enlarged causing suspicion of suppurating hydatid cyst or of liver abscess, but the excellent general condition of the patient is usually a revealing pointer, and anti-syphilitic treatment in these cases has generally a rapid and sovereign effect.

Prolonged fever after accouchement and without puerperal explanation has been observed and described in syphilitics and has cleared up with the exhibition of anti-syphilitic treatment. False diagnoses and dangerous surgical intervention may be avoided by recalling this type of fever.

HYPOPYREXIA IN SYPHILIS may occur in :—

(i) *Acquired Syphilis*, but it is rare and only occurs in the secondary stage.

It is probably due to the associated anæmia, but there may be some syphilitic alteration in the Central Nervous System (bulb) or some vago-sympathetic affection or even some action on the thyroid which could account for the disturbance.

Whatever the cause, the hypopyrexia disappears with the anæmia under anti-syphilitic treatment.

(ii) *Hereditary Syphilis in Nurslings*.—In these cases, hypopyrexia is quite common (at around 96° F.) both in those with florid skin lesions as well as in those born with no revealing external signs or, in fact, in those born with every appearance of health.

Under the influence of specific treatment the hypopyrexia disappears, progressively and parallel with the intensity and duration of treatment, and there appears to be no relation between the weight and the temperature charts in these cases.

Many of them are resistant to treatment, especially when there are marked visceral changes, particularly in the liver. They are usually very heavily infected and much patience is required.

The liver appears to play a very important part in thermal regulation.

#### FEVER AS AN INDICATION OF THE REACTIVATION OF SYPHILIS OR THE FEVER OF THERAPEUTIC CONFLICT IN SYPHILIS.

"Therapeutic conflicts" of drug versus germ are accompanied by exacerbations of fever up to 102° to 104° F., the rise occurring soon after injection of the drug, but the temperature falling almost to normal within twenty-four hours.

This fever is a definite indication of the conflict in certain cases, where biotropism obtains with regard to the treponema, but where appreciable (clinically helpful) skin or visceral reactions are not provoked.

Therapeutic conflict does not always happen. Many cases of syphilis are treated without the least elevation of temperature. These are cases where the disease is quietly overcome by the medication and they have an excellent prognosis.

The feverish reactions to the battle between the disease and the drug are accompanied by shivering, sweats and general malaise starting just like an attack of malaria. They do not show any of the phenomena usual with arsenical poisoning.

The progressive disappearance of the fever on continuing medication seems to prove that these attacks are reactional and not toxic.

These pyrexial reactivations occur, not only at the beginning of the course of treatment, but even during the course and at the end of it in those cases of syphilis which are partially or totally resistant to medication with arsenic. They *must* be considered in any explanation of such phenomena as inter-therapeutic jaundice, and in post-therapeutic jaundice and neuro-relapses, etc., because the feverish reactions as well as the skin and mucous membrane reactivations show the possibility and the reality of the lighting up of visceral lesions under the influence of treatment.

By their persistence during the course of treatment these feverish attacks show that the living virus persists in the body. It is necessary to continue treatment, the cessation of which might prove dangerous.

When the pyrexial attacks occur during treatment with arsenobenzol, and disappear with the administration of mercury or bismuth, it is shown that, in certain cases, mercury or bismuth have a superior curative action to arsenic.

Stimulation of the parasite rather than a weakening of the body is suggested as an explanation of these feverish attacks because (i) they disappear when the dose is increased and the greater the augmentation of the dose the more quickly does the temperature fall and, (ii) the administration of the drug often provokes not only a rise in temperature on the day of injection, but sometimes a continuous fever lasting days or even weeks and with all the characters of the syphilitic fever described above: a fever typical of that associated with secondary syphilis—staying around 100·4° F.—and disappearing with the administration of a different anti-syphilitic drug, i.e. mercury or bismuth.

Charts of pyrexia accompanying therapeutic conflict often show clearly the intensity of feverish reaction following injection, and then the extinction of the feverish reaction in proportion as medication is continued, e.g. :—

(a) Case of secondary syphilis: Thermal reaction to 104° F. after the first injection of 0·45 gramme NAB; normal the day following. The only symptoms accompanying the fever were those like an attack of malaria, and without any real phenomena of intolerance

like vomiting and diarrhoea. A second dose of 0.45 gramme NAB was injected four days later, the dose not being increased in order to make sure that intolerance did not obtain. This second dose produced a temperature of 100.4° F., which fell to normal the day following. The third dose was of 0.6 gramme given five days later and produced fever of 100° F.; fourth dose of 0.6 gramme given after another five days gave fever of 100° F.; fifth dose, six days later of 0.75 gramme gave fever of 100.6° F.; repetition of this dose after a further six days produced no fever, and the course was completed to a total of 5.65 grammes in three further injections at six-day intervals without incident.

(b) Another case: First injection of 0.45 gramme and second injection four days later of 0.6 gramme gave no fever. Third injection of 0.6 gramme after a further five days produced fever of 104.6° F. Did this signify intoxication by or intolerance to the drug? The only symptoms were those described above, as with an attack of malaria, and suggesting microbic resistance rather than intoxication. The dose was increased to 0.75 gramme after a further six days and provoked fever to 103.8° F. as compared with the previous 104.6° F. Continuing the dose of 0.75 gramme at the next injection, the fever was 101.8° F. This reduction seemed encouraging and the treatment was continued with doses of 0.75 gramme to the end of the course with rapid lessening of feverish reaction.

It is probable that a quicker fall to normal would have occurred if doses of 0.9 gramme had been used.

(c) A third case: Four injections of 0.45 gramme NAB at five-day intervals each produced general and thermal reactions once reaching 105.4° F. with the fever persisting for two days after the last injection. Mercury salicylate was then given intramuscularly every other day for 3 doses and then again for 4 doses at three-day intervals. No fever occurred with the mercury, and it was possible to resume and continue treatment with NAB at doses of 0.6 gramme and then 0.75 gramme with no further reactions.

The fact that the mercury did not produce fever and that later doses of NAB could be given without reaction helped to show that the treponema was the cause of the initial fevers and not intoxication.

#### ACTIVATION OF SYPHILIS. BIOTROPISM AND SYPHILIS.

*Physical Agents.*—These can light up latent syphilis. X-rays do so at times, and produce an acute and erythematous form of lesion which develops with extreme rapidity and suggests that the vitality of the spirochæte is stimulated and that it becomes excessively virulent. Radium may have the same effect.

Cold is said to have a stimulant effect on microbic germs living in a saprophytic state in the body. It may bring about syphilitic nephritis, of which the syphilitic element may be missed. Equally it may provoke paraplegias in the secondary stage of syphilis. Cold, particularly damp cold, change of climate and the imminence of storms frequently excite the pains of tabetics.

Humidity and humid climates will provoke pain, swelling and deformity of fingers in a patient with chronic syphilitic rheumatism as early as the fourth or fifth day in such a climate. Mercury injections will make him comfortable.

*Chemical Agents.*—Despite their curative properties, drugs used in the treatment of syphilis can, under certain conditions, provoke activation of the disease (cf. provocative dose of NAB prior to Kahn test).

Syphilitic lesions of skin and mucous membranes are frequently increased, enlarged and multiplied by the initiation of treatment. These focal reactions are what are known as Herxheimers Reaction, and seem only to be explained by biotropism.

Similar reactions can and do occur in the viscera. Hepatic or renal symptoms may increase instead of diminish with treatment, and they are then frequently attributed not to the disease itself but to intoxication by the drug used. Intoxication can, of course, occur but the time factor, the chronological connection between the administration of the drug and the appearance of morbid phenomena, should be noted as a differentiating agent.

It is continually necessary to remind oneself that what is apparent on the skin as a result of syphilis, may have comparable lesions in the viscera.

This is particularly the case with the liver when, for example during treatment, a jaundice appears which has all the characters of jaundice of secondary syphilis, i.e. jaundice of retention: liver and spleen enlarged; tongue moist and no fever. Diagnosis is by no means easy but, if there are no other signs of arsenical intoxication, one can be reasonably certain that the jaundice is infectious, i.e. syphilitic and not toxic.

The great difficulty in many cases, especially in the African with his already otherwise affected liver, is to decide whether the biotropism is direct, i.e. towards the treponema, or indirect towards some other latent infection of the body, e.g. malaria.

The problem is still further complicated in the African by the necessity for deciding whether he is immune or not to malaria because, if he is an immune, the incidental infection by syphilis and the probable intravenous injection of NAB may have occasioned a considerable degree of malarial parasitization which might well prove very misleading.

Nerve involvement is also quite common as a biotropic manifestation of syphilis. The facial and auditory nerves swell in the aqueduct of Fallopius and are there compressed. For the cochlear branch of the auditory nerve, the reaction of activation is shown by buzzing in the ears and deafness. Reactivations in the vestibular branch may be shown by vertigo and vomiting.

Thus there may be almost an appearance of cerebral accident, with sudden blindness, or deafness, or inability to speak. A number of such cases were seen in Abyssinia, and all reacted well to bismuth therapy.

The fulminating pains of tabes may be evoked under the influence of treatment, but diminish with the injection of larger doses of drug at shorter intervals.

These reactivations are usually accompanied by feverish reactions more or less violent. Actually, since one does not see inside the body, the fever may be the only appreciable sign of reactivation. In other words, there may be no *recognized* visceral localization, but only a feverish reaction with general malaise, muscular pains and shivering.

It is mostly with the small dose of drug that the danger of therapeutic conflict is established; meaning that these therapeutic activations are most frequently observed when treatment has been insufficient as to dose and duration. They may also occur when the spirochæte has been particularly resistant to the drug used, and they can then occur with medium or even large doses, especially of arsenobenzol which is pre-eminently the most activating of all the anti-syphilitic drugs.

Above all, it must not be thought that feverish reactions will occur in every case, nor indeed after every injection. Even if temperatures are taken with care, it is not more than one in six patients who presents febrile reactions; providing *always* that due regard is paid to the quality and administration of the drug and to the previous history and the preparation of the patient.

*Infectious Diseases.*—These can light up old syphilis and produce syphilitic lesions in patients whose syphilis was thought to have been extinguished.

Such diseases are pneumonia, typhoid, "rheumatism," herpes and scarlet fever.

When rare complications such as gangrene of toes or arteritis obliterans arise during any of the infectious diseases, the presence of syphilis should always be suspected.

Similarly, syphilis may activate latent pyrexias as malaria.

*Intercurrent Disease.*—Accidentally simultaneous diseases need no elaboration in these notes.

#### FEVER AS A MANIFESTATION OF INTOXICATION BY THE DRUG.

The dosage, administration and particularly the quality of the drugs (arsenicals) used have been discussed in a previous memorandum.

The following are a few points in the comparison between intoxication and intolerance which may prove helpful.

*Intoxication* is produced by an agent which is poisonous.



The noxious dose is more or less identical for everybody.

The effects increase with each addition of the drug, i.e. the effects are proportionate to the dose.

The effects are logically connected with the cause, different drugs producing different reactions.

The agent (drug) plays the greater part, the soil (patient) being accessory.

*Intolerance.*—Here the noxious agent is a reactogen and may be an inoffensive body like albumin, or even a physical agent.

The noxious dose varies with the individual.

There may be no noxious effect from large doses.

The intolerance may seem paradoxical, depending on the individual.

Identical reactions occur with different causes and are either (a) general : neuro-vegetative or vascular, or (b) local : inflammatory.

The soil (patient) plays the greater part, the agent (drug) being accessory.

In the charts of fever with intoxication, which are rare in comparison with those described above, the thermal reaction appears late after the injections, and increases in a progressive manner until the appearance of toxic signs and symptoms, for example vesiculo-œdematous erythrodermia.

There is always vomiting and diarrhœa, the body seeking to rid itself of the poison by every means.

#### CONCLUSION.

Pyrexial attacks in syphilis have been described suggesting :

(i) The possibility of fever being the presenting sign of syphilis.  
(ii) The danger of insufficient dosage and the necessity for not losing time by using feeble doses of arsenicals in the treatment of syphilis.

(iii) The importance of recognizing thermal reactions during the treatment of syphilis as an index to the resistance of the treponema, and as an indication of the necessity for either (a) increasing the dosage of arsenical or, more frequently, (b) changing the drug used, i.e. from arsenobenzol to mercury.

(iv) The advisability, in syphilitics who have had no treatment for some time, of preceding the exhibition of a course of arsenobenzol by the administration of mercury or bismuth for a sufficient time.

(v) The advisability of preceding the arsenobenzol by several spaced injections of bismuth in any syphilitic with florid skin manifestations.

(vi) Recognition of the fact that if sufficient mercury or bismuth is injected over an adequate period, the subsequent administration of arsenobenzol is unlikely to produce any activation of lesions or any febrile reactions. . . . To the greater physical comfort of the patient as well as to the greater mental comfort of his medical adviser.

I wish to express my thanks to Brigadier R. P. Cormack, D.M.S., East Africa Command, for permission to forward these notes.

REPORT ON THE HEALTH OF 401 CHINDITS.<sup>1</sup>

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THE "X" British General Hospital received its first convoy of patients from the "Special Force" (the second "Wingate" Expedition) on July 21, 1944, and further overflows from the advanced hospitals on three subsequent occasions. It is uncertain how representative these patients were of "Chindit" casualties. In the first place, cases diagnosed early as malaria were filtered off to Forward Treatment Units and, secondly, it may be presumed that the more seriously sick were also retained forward. [This is merely a special instance of a general problem—the limitations of hospital material for epidemiological study.] The 401 men who were evacuated here by aeroplane, flying boat, train and ambulance, after spending three to five months in the jungles of Burma, made a highly interesting group. The opportunity has been taken to report on them as a cross-section, though incomplete and "biased," of the morbidity of jungle warfare.

The term "group" has been used deliberately. These men came from all parts of Britain, belonged to different formations and presented manifold disorders, but they tended to conform to a clinical pattern and the group spirit was strong among them. What we learnt to call "the Chindit syndrome" soon emerged—the frequent association of long hair and long dirty finger nails; superior intelligence, morale and manners; fatigue and hunger, pallor and loss of weight, skin sepsis, diarrhoea and malaria.

Table I describes the conditions for which they were treated. Of the 401, 19 were Officers and 382 Other Ranks. On account of the small absolute (and relative) number of officers

TABLE I.—BILL OF MORBIDITY IN 401 BRITISH CHINDITS.

					Number of cases	Incidence, per cent of all patients
I. Disturbances of Nutrition						
Loss of weight, 10 lb. and more .. ..					171 (of 191 men)	90 (of the sample)
Glossitis—diarrhoea .. ..					86	21
Angular stomatitis .. ..					5	1.2
Oedema of the legs .. ..					7	1.7
II. Alimentary Infections .. ..					155	38
Dysentery .. ..					80	20
E. H. cysts .. ..					18	4.5
Worms .. ..					43	10
Flagellates .. ..					14	3.5
IIA. Simple diarrhoea (without glossitis or evident infection) .. ..					35	8.7
III. Infective hepatitis .. ..					87	22
IV. Malaria .. ..					127	32
V. Anæmia .. ..					108	27
VI. Skin sepsis .. ..					217	54
VII. Polyneuritis .. ..					14	3.5
VIII. Scrub typhus .. ..					6	1.5
IX. Weil's disease .. ..					3	0.7
X. Psychoneurosis .. ..					3	0.7
XI. Injuries (including enemy action) .. ..					21	5.2
XII. Miscellaneous .. ..					40	10
Total					1,085	—

1,085 disorders were thus discovered among 401 patients and this total omits minor skin sepsis, diarrhoea, short "P.U.O." and trivial conditions, generally, as well as unrecorded loss of weight (see text).

<sup>1</sup> Read at the Physicians' Conference, Alfsea, February, 1945.

these were not, except in one instance, analysed separately. This table raises some interesting points, positive and negative, which may be noted at the outset. The striking positive features are the frequency of multiple disorders (I think it may safely be said that each patient had two or three conditions requiring hospital treatment), and the immediate evidence of malnutrition to an unexpected degree. On the negative side the very low incidence of psychoneurosis was unexpected after two and a half years' experience of a British General Hospital in India.

#### CASE HISTORIES.

Following are six representative case notes of patients in the Medical Division, apart from the skin section :—

Pte. P., A.—Admitted with loss of weight (14 lb.), diarrhoea and a pustular dermatitis B.T. malaria was found on examination. Hb. 83 per cent. No cause was found for the loose motions. Regained 7 lb. in five weeks' stay.

Pte. P., J. J.—Lost 23 lb. Admitted with infective hepatitis. Glossitis—diarrhoea also present. Examination of the stools revealed a bacillary exudate. Regained 4 lb. in twenty-seven days. Evacuated for further treatment.

Pte. D., F.—Lost 15 lb. in Burma. Admitted with diarrhoea. E. H. Veg. found. Also had septic prickly heat and a whitlow. Eosinophils 1,440 per c.mm. Ankylostoma discovered on flotation.

Pte J., T.—Lost 27 lb. Admitted with diarrhoea ; microscopically nil significant in the stools. Also had jungle sores. Regained 8 lb. in hospital (21.7.44 to 28.8.44).

Pte. M., T.—Admitted with fever and diarrhoea. B.T. malaria (R) found and a bacillary exudate. Tinea cruris and severe impetigo also present. Eosinophils 1,572 per c.mm. Ankylostoma found in stools. Lost 14 lb. on the expedition. Evacuated.

Pte. R., J.—Admitted with jaundice. Tinea of flexures present. Had a simple diarrhoea while in hospital.

#### MALNUTRITION.

The severe wasting of many men was the outstanding clinical feature ; some loss of weight was general. It is difficult, however, to translate these clinical impressions into figures because the men had no documentary evidence of their weight prior to entering Burma, and many stated they had not been weighed recently. On close questioning, however, 191 men did appear to have a sufficiently precise recollection of their original weights to make comparison with the hospital findings of some value. All these were patients in the Medical Division, and they may be regarded as a representative sample of the whole group.

Among the 191, 41 men seemed to have lost 2 stones or more, 130 between 10 and 28 lb., 20 less than 10 lb. (2 of these claimed they gained during the expedition). The average loss, Table II, was 19 lb., i.e. very roughly, a loss of 1 lb. per man per week but the "scatter" was wide. Unfortunately I have no data on the weight record of the soldiers fighting in more "normal" conditions. Our own experience of a relatively inactive medical unit operating in an averagely unpleasant part of the Brahmaputra valley suggests that the "Monsoon loss" alone was rather less than 9 lb.

TABLE II.—THE LOSS OF WEIGHT IN 191 MEN.

Number whose Pre-Burma weight was "known"	Average loss of weight (lb.)	Range (lb.)	Mode (lb.)	Standard deviation	Standard error of mean
191	19	0-46	14	11	± .8

The next step was to break up the 191 into clinical types. The patients sorted themselves into the four classes of Table III. The trend of this table is clear ; it agrees with the expected operation of diarrhoea as a cause of wasting, and with the obvious clinical allocation of the patients on a nutritional basis.<sup>1</sup>

*Specific Deficiencies.*—To the naked eye there was very little evidence of specific deficiencies : 7 cases of angular stomatitis and 5 of œdema of the legs in very undernourished

<sup>1</sup> The chi square test applied to the data yields a probability of about 1 in 300 times that such a distribution might arise by chance ; i.e. the clinical classification is quite strongly supported.

subjects. That malnutrition was partly responsible for the anæmia is possible, and a B factor shortage is the common explanation, if only by analogy, of the "glossitis-diarrhœa" syndrome,

TABLE III.—LOSS OF WEIGHT IN 191 MEN—THE CLINICAL TYPES.

<i>Clinical type</i>	<i>Number of patients</i>	<i>Average loss of weight (lb.)</i>
1. Glossitis—diarrhœa syndrome .. ..	62	25
2. Alimentary infections .. ..	35	21
3. Miscellaneous conditions with incidental and simple diarrhœa .. ..	20	17
4. Miscellaneous conditions without diarrhœa .. ..	74	15
Totals	191	19

## ANÆMIA.

Understaffing made it impossible to estimate the Hb. per cent of all 401. 186 men had one or more examinations. These included all patients clinically suspected of anæmia and some leavening with routine determinations. Of the 186, 108 read less than 13·3 grammes per cent Hb. on our Sahli apparatus, recently standardized, and may be considered anæmic. The average was 11·9 grammes or 85 per cent. To help in evaluating these figures they were compared (Table IV) with 100 consecutive estimations made earlier the same summer, almost all in sick casualties from the more "normal" operations of the battle of Kohima. The "controls" show a superiority of 10 per cent hæmoglobin, a considerable difference among British troops.<sup>1</sup>

The level of hæmoglobin is, of course, a very crude indicator to pathology. In the present instance the anæmia may have been the end-result of malaria, hookworm, multiple infections, leech bites, underfeeding or of all of these or any combination of them. How to determine, at this stage, the influence of these several factors I do not know.

*The Production of Anæmia.*—To two interesting questions, however, it may be possible to return an answer, even if only a very incomplete one. In so far as anæmia was due to malnutrition a relationship might be expected between their anæmia and the weight lost by patients (wasting being an equally crude though probably more reliable measure of malnutrition). Evidence was therefore sought of any linkage between these two clinical indices. In the first place 107 men were separated in whom both the presumptive weight loss and the Hb. per cent were known. The average loss of weight in this group was 21 lb. Taking Hb. 85 per cent (11·9 grammes per cent) as the dividing line, it was found that the loss was 19 lb. in 69 of these men whose blood reached that level, but 26 lb. in the remaining 38 whose blood did *not*, and who were, therefore, suffering from material anæmia, i.e. those whose blood was most affected had also lost most weight. Next, the coefficient of correlation was calculated between the loss of weight in pounds and the fall of Hb. in units per cent after allowing for the difference in the average reduction of these 2 units—19 lb. and 15 per cent ( $r = +\cdot287$ ).

This is small but significant and might have arisen by chance less than once in a hundred times. A positive correlation coefficient may or may not indicate a causal relationship; in the present case a likely event is that a third factor (malnutrition) was among the causes of both. Finally, in an attempt to say how much malnutrition might be involved in the production of the anæmia, the regression coefficient for anæmia in terms of wasting, i.e. the average reduction in Hb. with the loss of each pound of weight, was computed:—Coefficient of regression = ·22. In other words, these two indices coincide in just over a fifth of their fields; as to almost 4/5 of its ætiology the anæmia appears to be unrelated to the factors

<sup>1</sup> The Standard Error (S.E.) of the difference between the two averages is 1·5. In routine statistical work the conventional level of "significance" is twice the S.E. which indicates the likelihood of the result arising merely by chance to be less than 1 in 20. The observed difference in the present instance, 10, is nearly seven times its S.E. and is thus highly significant with only a remote possibility of its occurring purely by chance.

producing the wasting; from which it may be inferred that malnutrition—in the present context probably a combination of underfeeding and diarrhoea—was not, anyhow, the main cause of the anæmia.

The next step obviously would be to correlate the anæmia with the volume and duration of malarial infection. Unfortunately this is even less the sort of investigation that can be carried out retrospectively, and, at the time, we were thinking of other things. Looking back, the patients in whom we found parasites must have been clinically the most anæmic, for we did Hb. estimations in about three-quarters of them compared with under a third of the rest. If the discovery of parasites here in patients irregularly on suppressive mepacrine and usually after blanketing is any sort of indication of heavier infection, it is interesting that the average Hb. per cent among these was 83 as against an average of 91 per cent in the rest. (Patients with hookworm were excluded.) This, for what it is worth, seems the only approach that can now be made to the important question of the cause of the anæmia.

#### GLOSSITIS—DIARRHOEA ("G-D").

There were 86 cases of "glossitis," part apparently of the syndrome of glossitis—diarrhoea-wasting-anæmia which is usually (and unhelpfully) called "para sprue," [2] was quite uncommon in the hospital's South Indian experience and developed acutely in the few weeks prior to admission. These formed the most interesting group of all and will be described in some detail.

*The Tongue.*—Clinically there appeared to be stages of:

(a) *Activity*, with atrophy of epithelium, ulceration, fissuring, hypertrophy and œdema. The atrophy was of every extent from a few millimetres to the whole of the anterior tongue and revealed a red shiny base. Islets of superficially affected papillæ with prominent scarlet heads often stood out on the flat surface. The ulcers were marginal; one or many were present without any very clear relation to the severity of the atrophy. They were commonly shallow with red and angry edges. Cracks were noticed mostly on the mid-line with branches extending on both sides though not to the margins. Areas of heaped up tissues occurred in particular between the fissures. Swelling was associated with pallor rather than redness and teeth indentations were frequent near the tongue edge. Apart from atrophy, apparently the essential lesion, the other constituents of the picture varied from case to case and one or all were commonly absent.

(b) *Repair* with what appeared, to the hand lens, the formation of new papillæ, filiform and fungiform, covering the denuded areas and healing the ulcers. The shiny redness faded into more normal coloration with often a bluish tinge.

Pain and loss of hypercuity of taste were inconstant and bore no obvious relation to the activity of the degeneration. Red patches on the soft palate occurred, but infrequently.

*Diarrhoea.*—The stools were examined in almost all cases, with these results:—

(1) Evidence of alimentary infection .. .. .	35 cases = 41 per cent
(2) Steatorrhœa .. .. .	3 cases
(3) Simple diarrhoea .. .. .	40 cases

Thus, alimentary infections were in fact rather more common in this group than in the remainder of the 401 who did not have G-D, and they were of a similar nature. Whether the intestinal upset of past or present infection is a factor in the production of the syndrome cannot be argued now. It would have been instructive to treat these patients routinely with sulphaguanidine but unfortunately this was not done. In 2 of the 3 cases the microscopic excess of fats was confirmed chemically (58 per cent and 31 per cent of the stool; normally split). In other respects these two cases did not apparently differ from the rest. The simple diarrhoea was often slight and usually watery, with pale rather bulky motions containing evident undigested material.

*Wasting.*—The average loss of weight in these cases, as already indicated, was 25 lb.; on further calculation it was found to be 23 lb. in those with alimentary infections and

26 in those without, thus emphasizing the responsibility of the syndrome itself as a cause of wasting. (The difference (Table III) between the average loss of 25 lb. in the G-D group and 19 in the whole group of 191 men, 6 lb., is unlikely to have arisen by chance as its standard error is 1.3; a further confirmation of previous findings.) In keeping with the experience of these cases as the most undernourished, 4 of the 5 examples of *angular stomatitis* and 6 of the 7 with *peripheral œdema* occurred in them.

**Anæmia.**—Anæmia is usually considered an essential feature of the syndrome. Hb. per cent was estimated in 69 of the 86 cases. Table V also shows the findings in the majority of the 186 (Table IV) whose blood was examined, but who did *not* have G-D. The results are illuminating. In this small series the anæmia was not particularly striking (average Hb. 83 per cent) and it was not significantly different from that found in a strictly comparable group of patients who did *not* have glossitis with diarrhœa. Which serves, if nothing else, to emphasize the difficulty of disentangling any clinical entity from the multiple pathology of this part of the world.<sup>1</sup>

In view of the small though definite relationship demonstrated above between loss of weight and fall in Hb. the slightly lower Hb. level of this group might, very well, be merely a function of their greater wasting.

Sufficient R.B.C. counts were not done to justify any conclusion on the type of the anæmia.

TABLE IV.—ANÆMIA: THE HÆMOGLOBIN LEVEL IN 186 MEN.

Group	Number	Average Hb. per cent	Standard deviation	Standard error of mean
Chindits	186	85	10.5	± .76
" Controls "	100	95	13	± 1.3

100 per cent = 14 grammes Hb. per cent, standardized.

(100 per cent Haldane = 14.8 grammes Hb. per cent.)

TABLE V.—ANÆMIA IN PATIENTS WITH AND WITHOUT THE GLOSSITIS—DIARRHŒA SYNDROME

	Number of cases	Average Hb. per cent	Standard deviation	Standard error of mean	Co-efficient of variation
Glossitis—diarrhœa syndrome	69	83	11.5	± 1.4	14
The rest—miscellaneous conditions	117	86	10.2	± .95	12
Total	186				

**Other Features.**—Distension and flatulence were common. Temporary anorexia often occurred. Ordinary examination of the nervous system revealed nothing particular. Asthenia was marked but hardly specific. There were no complaints of photophobia. No characteristic skin lesions were noticed. Test meals were done in 17; 3 had hyperchlorhydria, 8 had normal curves, 2 hypochlorhydria and 4 achlorhydria (alcohol fast).

**Comment.**—The 86 men with glossitis, flatulence and diarrhœa were the worst nourished of all. 41 per cent had obvious alimentary infections, i.e. a somewhat higher incidence than in the whole group of 401. The tongue changes agree well enough with those described in various B<sub>2</sub> deficiency syndromes, in particular in anisocytosis. Anæmia was not a feature of this series. (The prominent macrocytic anæmia of "para sprue," as it is usually described in Indian patients, may possibly be due to simultaneous deficiency, or inadequate reserves of the "extrinsic," or other B<sub>2</sub> factors.) A follow-up of these cases to discover whether any develop sprue would be instructive.

#### RATIONS—AND THE CONSUMER.

Long range penetration into the jungle behind enemy lines does not permit of the transport of bulky rations, and opportunities are limited for supplementing, "off the land," the food which is carried. The basis of the Chindit diet during their stay in Burma was the "K"

<sup>1</sup> The S.E. of the difference between the two averages is 1.8. The observed difference of 3, therefore, is less than twice its S.E. The + test shows that the probability (P) of such a difference arising merely by chance is as much as once in ten times.

ration reinforced as far as possible by multi-vitamin tablets, and air drops of fresh supplies. These last, of necessity, were irregular. The "K" ration is a compact and closely calculated dietary and the problem arises why, in general, the men lost weight and, in particular, developed glossitis, on the face of it a B<sub>2</sub> deficiency syndrome. Table VI sets out the relevant nutrients of the "K" ration and compares them with the optimal standards suggested by the National Research Council, U.S.A. [3]. The only indication of any *primary* inadequacy

TABLE VI.—DIETARY STANDARDS.

- (1) Recommended by National Research Council, U.S.A., for a very active man weighing 70 kg.  
 (2) Supplied by full "K" ration.

	Standard	Calories	Thiamine mgm.	Riboflavin mgm.	Nicotinic acid mgm.
(1) N.R.C.	..	4,500	2.3	3.3	23
(2) "K." Ration	..	app. 3,400	1.5	2.1	app. 16.3

that might lead to malnutrition is the total number of calories which fall several hundred short of the optimum. The strenuous nature of the operations, the fatigue and broken sleep, suggest figures of 3,500–4,000 C as the possible heat output. If the usual intake was 3,000–3,400 C, burning of body tissue equivalent to the average loss of weight of 1 lb. per man per week might well result. Speculation on possible, *secondary*, or "conditioning," factors is unlikely to be very profitable but several interesting points arise. Dietary monotony in itself is not unknown to cause B vitamin deficiencies as the history of pellagra in the Southern United States and beri beri in the Far East illustrates. The Chindits soon tired of these concentrated and synthetic foods; "they all tasted the same," "they all tasted of chewing gum," "there was nothing to bite on" were the commonest complaints. Much in fact was left uneaten and what, on paper, may appear sufficient if not optimal might in practice turn out very differently.<sup>1</sup> Poor thiamine intake, in turn, might aggravate this anorexia. Further, there is a suggestion from what I was told that the fraction of the ration which actually was eaten contained a disproportionate amount of its carbohydrate, long recognized as a factor in the precipitation of B<sub>1</sub> and, more recently, possibly of B<sub>2</sub> deficiencies. Interference with absorption by diarrhoea is clinically the clearest association of wasting (Table III). Whether the peculiar malabsorption of sprue also occurs in the G–D syndrome has not, as far as I know, been investigated. Interference with spontaneous synthesis of B vitamins by sulphaguanidine therapy and their excessive excretion in the sweat are even more conjectural.

*Treatment of Malnutrition.*—We aimed at providing a first-class diet which, analysed by food tables, contained, on the average, approximately: 4,000 calories; 120 grammes animal protein; 100 grammes fat; 15 mgm. iron; 10,000 I.U. vit. A.; 4 mgm. riboflavin; 28 mgm. nicotinic acid; 85 mgm. ascorbic acid. (Supplements of cod-liver oil, ascorbic acid and beef extract were included as a routine.)

In practice this was not at all easy owing to the peculiar circumstances in which we were situated. However, by sundry manipulations we managed to produce four nutritious and moderately attractive meals a day which approached, if they did not sometimes achieve, the standard we set ourselves; and with some of these men "elevenses" and, soon, the nightly visit to the canteen, often made a fifth and sixth. Some patients had an initial nausea, and even sickness until they were accustomed to the relatively gargantuan bulk of the hospital dietary. In a few anorexia was troublesome, in some, appetites seemed to be insatiable. The length of stay in hospital depended too often on factors irrelevant to the purely medical condition of the patients to permit any confident statement on the response to treatment. It may be said that often, despite the elimination of obvious infections, it was a matter of weeks before a few pounds were regained. In the patients with G–D, improvement of the tongue epithelium and of the diarrhoea was strikingly earlier than improvement in general nutrition. In contrast were half a dozen men who developed an acute "glossitis" while

<sup>1</sup> In consequence the need for more attractive light rations designed for consumption over prolonged periods—the "K" Ration was intended for short term use only—has now been met.

in hospital and on a good diet. In one a complete superficial atrophy was produced in two to three days, in the others it was patchy, in all the tongue quickly epithelialized again. There did not seem to be any deficiency of computable B<sub>2</sub> factors, either absolute or relative to the calorie intake, or to each other, which might account for this phenomenon.

Liver and dried yeast were scarce, yeast extract plentiful and this was freely used. Supplies of nicotinic acid were erratic, of riboflavin nil, and the contents of these vitamins in the basic diet high. No opinion can therefore be expressed on their value in the treatment of patients with malnutrition in general or with glossitis in particular.

#### ALIMENTARY INFECTIONS.

The dysenteries were made up thus :—

Protozoal .. .. .	45 cases
E.H. Veg. .. .. .	21
Clinical .. .. .	24*
Bacillary type .. .. .	32 cases
Amoebic hepatitis .. .. .	3 cases might also be included.

\* A clinical diagnosis of amoebic dysentery was made on the combination of clinical findings, history, exudate  $\pm$  E. H. cysts, and the response to specific therapy.

18 men in all had amoebic cysts ; hitherto, in S. India, we very rarely found them.

Flagellates as follows :—

Giardia .. .. .	9 cases
Trichomonas H. .. .. .	5 cases

Infestations of these genera :—

Ascaris .. .. .	24 cases
Ankylostoma .. .. .	17 cases
Trichuris T. .. .. .	2 cases

These last figures were disappointingly small as a large number of examinations were done for anæmia, loss of weight, gastro-intestinal disturbances and eosinophilia. On the other hand, of 40 individuals with worm infestations 25 had W.B.C., 13 showing eosinophilia and 12 normal counts. Ankylostoma was oftener associated with high eosinophil counts than Ascaris.

Several men had two or more types of alimentary infection.

The 35 examples of "simple diarrhoea" without glossitis or evident infection were all of some severity and all occurred in this hospital. They were not, perhaps, investigated as exhaustively as they might have been. Sporadic sulphaguanidine may have masked bacillary infections. If a *history* of diarrhoea had also been accepted the total who suffered at one time or another would have approached 100 per cent.

#### SKIN SEPSIS.

Trivial infections complicating prickly heat were omnipresent. Considered worthy of note were 106 examples of "I.A.T." (indolent ulcers usually of the legs) and 111 severe attacks of impetigo, tinea, otitis externa, etc. There were some appalling infections involving large areas of the body surface. In general the skin cases did remarkably well despite the twenty-four hours' daily drip of sweat of the Indian summer. As regards the jungle sores comment may be limited to remarking that, for the first time, I was impressed by the possibility of a material nutritional element in these cases. Despite any particular "line" on treatment, as the general state of the patient improved the ulcers often cleared up much quicker than our South Indian disappointments led us to expect. Examination for L.D. bodies in a fair number of patients was unsuccessful : from four ulcers we recovered K.L.B.



## EOSINOPHILIA.

A word may be said here on eosinophilia. 51 men, i.e. 13 per cent of all, had more than 500 eosinophils per c.mm. The highest number was 10,494 per c.mm. All these with very high counts had skiagrams which excluded "eosinophil lung." 13 of the 51 had worms. Of the remaining 38, 33 had their stools examined—104 direct examinations, and 19 of the 33 had, between them, 34 stool flotations, all with negative results. Review of these 38 men showed that 21 had skin sepsis or jungle sores of average, or more than average, severity and duration; in the other 17 there was nil of note. In this group of 51, i.e. a potentially responsible or contributory factor was found in 34 (13 with worms, 21 with skin complaints) and no clue to the cause of the eosinophilia discovered in 17.

## INFECTIVE HEPATITIS.

There were 87 cases of infective hepatitis making an incidence of 22 per cent in the whole group of 401. This was unexpectedly high compared, e.g. with the 8.5 per cent in Leishman and Kelsalls survey of 11,645 medical cases [4] and when it is remembered that all contracted the infection during the summer. Two of the men with jaundice were on anti-syphilitic treatment; none had yellow fever inoculation. This, it should be noted, was a body of seasoned troops. Analysis of random samples of 30 men with jaundice and 100 without showed that the length of service in India averaged twenty-four months in the former and twenty-two and a half months in the latter; which does not suggest lack of previous opportunity to acquire immunity was a material predisposing factor.

On the possible routes of invasion, it can be said that living and fighting in the jungle did not particularly favour contact or droplet infection. Insects were omnipresent. Alimentary infections were common.

*In Officers and Other Ranks.*—The rates among officers and O.R.s were analysed in the hope of shedding some light on the vexed question of the class incidence of this disease. In the Middle East, as is well known, infective hepatitis occurs much more frequently in officers than in other ranks [5]. In the present campaign officers and men were exposed to the same trying conditions and there was neither tent life nor opportunity for mess infection by communal cutlery and the like. (I did not inquire closely into the consumption of alcohol but fancy there was too little anyhow.) Table VII gives the results and reveals a considerably greater infection rate among the officers.

TABLE VII.—THE INCIDENCE OF INFECTIVE HEPATITIS IN BRITISH OFFICERS AND B.O.R. PATIENTS.

	Cases	Total No. of patients	Case incidence per cent
Officers ..	8	19	42
B.O.R.s ..	79	382	21

By the chi square test (fourfold table)  $X_2 = 4.95$ , which (with 1 degree of freedom) means that the probability of such a distribution arising by chance is 1 in 30 times, i.e. the difference in the case incidence among the two classes is statistically significant. When, as a refinement, Yates' correction for continuity is calculated to allow further for the small number in the sample,  $X_2 = 3.7$ —the stricter test shows the chance probability to be 1 in 19, i.e. just below the level of significance.

This differential incidence, if confirmed, would be an important lead to the operation of some predisposition among British officers which, in the circumstances of jungle warfare, must have been effective *before* and not *during* the campaign. But it was not confirmed. Examination of the records of the whole expedition kindly made available by D.D.M.S., Special Force, reveals an opposite trend—the disease was in fact rather more common in B.O.R.s than in officers; and this agrees with the experience of 14th Army as a whole. We are therefore, in this theatre, left with the interesting position found elsewhere in certain Dominion and Allied Forces: where the living conditions of officers and men are roughly the same the incidence of infective hepatitis is not greater among the officers. (The pre-

ponderance among the men in this instance is probably of no special significance in view of the greater load of all important infectious diseases among them.) The above, incidentally, well illustrates the dangers and difficulties, already referred to, of drawing epidemiological conclusions from hospital records.

#### MALARIA.

This was the distribution :—

B.T.	..	..	..	..	..	..	..	108 cases
M.T.	..	..	..	..	..	..	..	11 cases
(Mixed	..	..	..	..	..	..	..	1 case)
"Clinical"	..	..	..	..	..	..	..	8 cases

Adrenalin stimulation was frequently and successfully used, sternal puncture occasionally. Such figures probably bear little relation to the volume of infection among the Chindits. Many were diagnosed early and diverted to the Special Forward Treatment Units, many, doubtless were "blanketed" before they presented an obvious clinical attack. A good number were yellow with mepacrine.

#### POLYNEURITIS.

There were 14 cases, all but 2 clinically post diphtheritic, developing as far as could be judged rather late, with skin ulceration or healed scars and usually evidence of disturbance of accommodation. In only 1 did we recover K.L.B. One of these patients died shortly after evacuation from here with respiratory paralysis.

#### SCRUB TYPHUS.

The only death that occurred in this hospital was an example of overwhelming typhus toxæmia. The series is too small to bear analysis. Our six examples were all contracted during the monsoon.

#### WEIL'S DISEASE.

After many "misses" in South India we diagnosed our first three cases of leptospirosis<sup>1</sup>:

Pte. A. J.—A clinical picture of fever with painful muscles and, later, petechiæ and jaundice which was mild and transient. Urine: 7th day—pus and R.B.C.; present for three days. Agglutination at School of Tropical Medicine, Calcutta, 1:1,000, L.Ict. Hb. 66 per cent. W.B.C. 23,600; P. 20,532, L. 2,832, eosinophils 236 per c.mm.

Gnr. B. S. This man was very ill on admission. B.T. malaria was treated. Jaundice was deep and for several days he was drowsy. Pneumonia developed. In the second week OXK agglutinated 1:125 but later dropped to zero. Urine N.A.D. throughout. W.B.C. 17,000; P. 14,280, L. 2,550, E. 170 per c.mm. Hb. 70 per cent. Agglutination with L. Ict. 1:1,000.

Pte. C. L. This patient was admitted for diarrhœa; glossitis and angular stomatitis were also present. Hb. 85 per cent. While in hospital he ran a twelve-day fever which was unexplained by any of the routine investigations. On the tenth day, however, examination of urine now showed albumin and pus cells which persisted for a couple of days. No icterus present. W.B.C. 12,400, P. 4,464, L. 7,688, E. 248 per c.mm. on third day; later normal. Agglutination with L. Ict. at Calcutta, positive, 1:1,000.

D.G. examinations of urine were negative in all three. Summing up, the first case was classical; the second presented as an unexplained jaundice, the third as "P.U.O." with a passing urinary infection. Opportunities for infection were ubiquitous, and the men seem to have exposed themselves to every known method of acquiring leptospirosis except the curing of fish. They all made satisfactory recoveries. In none of the cases was the diagnosis confirmed in time to try penicillin or serum.

<sup>1</sup> In the last nine years, an average of only 10 cases a year of leptospirosis have been diagnosed in all India, to the knowledge of the School of Tropical Medicine, Calcutta [1].

## MISCELLANEOUS INFECTIONS.

This assortment of infections included 6 of conjunctivitis, 7 of thrush, 7 of pharyngitis, 6 of otitis media, 7 of bronchitis, 1 of mitral stenosis (without obvious cardiac enlargement who carried through the whole expedition and reported sick with amœbic hepatitis), 1 of pulmonary tuberculosis and 1 of acute kala-azar.

## PSYCHONEUROSIS.

In the month of June, among 250 admissions to the medical ward, mostly from the battle of the Kohima-Imphal Road, there were 14 cases of neurosis and 10 downgradings on this account. In S. India about 8 per cent of the officers admitted to the Division and 6 per cent of the B.O.R.s were so diagnosed. The 3 cases among the 401 Chindits were mild; only 2, as far as I could see, were related to the campaign, and these cleared up quickly. The point is not worth labouring, however, as the difference between the expected and actual incidence of neurosis is so gross as to be, most likely, the result of special arrangements made for evacuation of such cases. The infrequency of neurosis, nevertheless, is in keeping with the high morale of these men as observed even in hospital.

## SUMMARY.

401 medical casualties of jungle warfare are reported. The patients were all British troops; each on the average had 2 or 3 conditions requiring hospital treatment. The loss of weight during the expedition seemed to be in the region of 1 lb. per man per week. The average level of hæmoglobin in a large sample was 11.9 grammes per cent. 86 men were suffering from glossitis with flatulence and diarrhœa, a syndrome hitherto very uncommon in two and a half years Indian experience. These were the most undernourished of all; there was no evidence, however, to suggest that they were particularly anæmic. In general, two factors seem to have been responsible for the malnutrition: underconsumption and diarrhœa. Over a third of the patients had obvious alimentary infections. Eighty-seven were suffering from infective hepatitis. Skin sepsis was omnipresent and more than half the men required active treatment for infections and indolent ulcers of some severity. The special medical arrangements of this theatre probably account for the relatively few cases of malaria. There were 14 cases of polyneuritis, clinically post-diphtheritic, 6 of scrub typhus, 3 of leptospirosis and sundry other infections.

These notes give some idea of the condition of a group of the Chindits at the end of the expedition. Their final state cannot be described as the more seriously ill were evacuated to India for further treatment and the rest were transferred to convalescent depots for rehabilitation. The report, however, may afford some guidance in the planning of future jungle operations.

## ACKNOWLEDGMENT.

I am grateful to Captain P. M. Wright, R.A.M.C., and the other medical officers and Sisters whose work this report summarizes, to the laboratory staff of the hospital, to friends who have read and suggested improvements in the MS. and to my Commanding Officer for permission to forward this paper.

## REFERENCES.

- [1] CHAUDHURY, R. N. (1944). Personal Communication.
- [2] CHAUDHURY, R. N. and CHAUDHURY, M. N. R. (1944). *Ind. Med. Gaz.*, 79, 9.
- [3] JOLLIFFE, N. (1942). "Preventive Medicine in Modern Practice," New York, p. 112.
- [4] LEISHMAN, A. W. D., and KELSALL, A. R. (1944). *Lancet*, ii, 231.
- [5] WITTS, L. J. (1944). *Brit. Med. J.*, ii, 739.

### *Editorials.*

#### THE CELEBRATION OF THE CENTENARY OF THE BIRTH OF LAVERAN, 1845-1922.

THE French Army Medical Services celebrated recently the centenary of the birth of one of its most famous officers, Alphonse Laveran. It was while working in the Military Hospital, Constantine, Algeria, that Laveran discovered in the fresh whole blood of one of his patients examined under the microscope the parasites of malaria. Of this discovery Calmette said, "Before him no one suspected the pathological role of the hæmatozoa, it is no exaggeration to say that the work of Laveran seems to-day as the most important in medicine and hygiene after that of Pasteur."

On Thursday, July 12, 1945, a bust of Laveran was unveiled in the Salles Laveran of the Military Hospital, Val-de-Grâce, Paris, by Médecin-General Inspecteur Arène before a distinguished audience of French and other officers and scientists, and also present at this and subsequent ceremonies was Madame Laveran, the widow of the famous scientist. In the same hall where the bust was unveiled were many mementoes of famous French Military Surgeons, Larrey, Percy and an excellent portrait of Ambroise Paré.

Following this short and impressive ceremony an account of the famous hospital of Val-de-Grâce was given by M. André Hurtret, Conservator of the Château of Vincennes. The very name Val-de-Grâce carries healing in its wings and no military hospital is more famous. Conducted by M. Hurtret we went round the building and he pointed out the numerous interesting architectural features. We also visited the historic room which the foundress, Anne of Austria, Queen of Louis XIII, had occupied during her frequent visits to the Monastery.

The Val-de-Grâce has a romantic history; it is the descendant of a famous Abbey of the Benedictines which had fallen on evil times but was eventually rebuilt on its present site by Anne of Austria and occupied by the Order in 1624. The Queen took a great interest in the Monastery, visiting it at least twice a week and often staying with the Abbess Marguerite d'Abouze to whom she was much attached. Cardinal Richelieu intervened because of the Queen's alleged use of the monastery of Val-de-Grâce for correspondence inimical to his policy and Anne was forced to abandon her visits. Anne who had been married for twenty-one years then made a vow to build a magnificent monastery and church as a thank-offering if there should ever be an heir to the throne. On April 1, 1645, her son (Louis XIV), aged 7 years, laid the foundation stone of the church. Anne, now Queen Regent, Louis XIII having died in 1643, and Richelieu the year previously, was free to visit the Val-de-Grâce as and when she pleased. She had apartments there, one of which is still shown with her portrait and a large A in the centre of the floor surrounded by a laurel wreath and surmounted by a crown.

The church, which is part of the building of Val-de-Grâce was renowned for the fact that here the hearts of members of the Royal family of France were deposited, including those of Anne and Marie Thérèse of Austria, and in 1854 the heart of Baron Larrey, Napoleon's famous surgeon, was placed there.

In 1793 the Val-de-Grâce became by a decree of Government a military hospital and has remained so ever since. In 1850 a School of Military Medicine was founded in the Val-de-Grâce (École d'application de la Médecine Militaire). Besides the hospital and the school of Medicine the Museum is famous.

Laveran was Director of the School from 1872 to 1875.

The celebrations were continued in the afternoon.

In the great hall of the Sorbonne tributes were paid to Laveran under the chairmanship of the Minister of War, M. André Diethelm. Amongst those who spoke were M<sup>d</sup>c<sup>g</sup>in-General Inspecteur Vincent who had been a student under Laveran and could give some personal reminiscences of the great man. General Jame spoke of his work as a scientist and General Rieux of his work on malaria, while Dr. Noel Bernard recounted his work at the Pasteur Institute after retirement from the Army; how he worked on Protozoology with Felix Mesnil and how he was awarded a Nobel Prize in 1907 and endowed a laboratory for Protozoology at the Pasteur Institute.

Colonel Debenedetti, the Director-General of the French Army Medical Service, in a moving address paid tribute not only to Laveran but to military doctors in general and the proceedings were brought to a conclusion by a short address from the Minister of War who referred to the political importance of Laveran's work in the populating of the tropics and paid also a tribute to the British and American Army Medical Services. Between the speeches the Band of the Republican Guard discoursed a programme of music and amongst the pieces played was a composition by Colonel Debenedetti, the Medical Director-General, entitled "*Hommage aux Morts du Service de Santé.*" The composition was received with enthusiasm at its first public hearing and the composer received an ovation.

In the evening a dinner attended by many scientists was held. On the following day a visit was paid to the penicillin factory run by the French Army Medical Service. This factory, in a converted garage, is very well organized and great energy and enthusiasm have enabled it to get into production within a very short time and its production is rapidly increasing.

That night Paris was *en fête*: it was the eve of the Fourteenth July, the National holiday, and the city was gay with flags and floodlighting, and La Ville Lumière was once more a reality.

### IS YOUR SPLEEN REALLY NECESSARY? <sup>1</sup>

Is an otherwise healthy man at any disadvantage because he has had his spleen removed—on account of an abdominal injury, for example? Most surgeons of any experience are able to give the names of splenectomized patients who enjoy normal health and engage in an active life. But how about their reaction to the severe strains that may at any time become the lot of a fighting soldier? If a man without a spleen is wounded, will he bleed more seriously than another who has a spleen? And will his blood-volume be as easily restored? If he is exposed to malaria, will he be more susceptible to infection and less responsive to anti-malarial drugs? And how will he stand up to strenuous exercise? In short, is he fit for medical category A? These questions have recently been before medical boards and it has now been accepted that if a man is otherwise fit the loss of his spleen is not by itself a reason for downgrading his medical category. It may be of interest to give a brief outline of the reasoning and observations behind this conclusion.

*Spleen as Blood-Reservoir.*—Barcroft and his associates established beyond doubt that the spleen acts as a blood-reservoir in certain animals. But there is evidence that it has no such function in normal human subjects, although this may be otherwise in certain pathological states. One of Barcroft's findings in support of his theory was that the blood-volume increased in man in response to exercise. But modern methods of estimating blood-volume—by Evans-blue, for example—are more accurate than those used by Barcroft in his original work. American investigations have now shown that exercise actually causes a slight decrease in plasma-volume and an increase in hæmatocrit, hæmoglobin, and serum-proteins and that these findings are similar in normal and splenectomized subjects. Further doubt is cast on the blood-reservoir function of the spleen by the experimental work of McMichael

<sup>1</sup>This editorial is re-printed in *A. M. D. Bulletin* No. 51 (September, 1945).

and Sharpey-Schafer who noted in man that hæmorrhage caused a fall in intra-auricular pressure that was related to the amount of blood loss ; it was evident that no reserve blood was coming from the spleen or anywhere else into the circulation.

Higher temperatures, such as prevail in tropical climates, cause a very slight increase in blood-volume and hæmoglobin. But the gain in plasma-volume is very small and is probably made at the expense of the tissue-fluids. There is nothing on this ground to suggest that lack of a spleen will be a handicap to a man in the tropics.

*The Spleen and Malaria.*—In the tropics men have to face the risk of malaria and other infections. The spleen is a part of the reticulo-endothelial (R.E.) system, which is considered of great importance in the mechanism for overcoming infection ; R.E. cells are phagocytic, ingesting degenerate bacteria-laden polymorphs as well as organisms, and it has been suggested that they are the ultimate source of antibodies.

In splenectomized monkeys, it is true, malaria is liable to produce attacks of exaggerated severity, but there is no difficulty about its control by the usual drugs. This matter has been studied with great interest in India both in experimental animals and in man and the opinion is that the body responds to splenectomy much as it reacts to tonsillectomy : the R.E. system is extensive and other cells take over the duties of those removed. Thus, whatever the temporary effect of splenectomy, there is no lasting impairment of the ability to deal with infection. In actual experience several civilians and soldiers have been able to work with normal efficiency in highly malarious areas although their spleens had been removed. One, in particular, a regular soldier who had served in Malaya before the war, fought all the way back in 1942 through Burma to India ; in spite of the hard conditions of this campaign and the absence of his spleen, he did not develop malaria. At the end of 1944 he was still in India and still thoroughly fit.

*Response to Strenuous Exercise.*—Recently, three young officers who had lost their spleens because of injury volunteered to undergo strenuous tests of their physical capacity. At the end of four weeks in a Physical Development Centre they had attained the degree of physical fitness that is expected of normal trainees in nine weeks. These volunteers, of course, were keen to prove their fitness but there was good objective evidence that their physical condition was really satisfactory from the ease with which they passed their final test. This involved : (1) carrying a man of one's own weight for 100 yards ; (2) covering an obstacle course of 120 yards ; (3) covering two miles by running and walking ; and (4) marching twelve miles at 4 m.p.h. with halts of ten minutes each at the fourth and eighth miles. For items (1) to (3) of this test the time allowed was twenty-five minutes ; then followed a halt of ten minutes before item 4, for which the time allowed was three hours twenty minutes. The whole test was done in full battle-order—that is with equipment-filled haversack, steel helmet and rifle.

The opportunity was also taken to make examinations of the bleeding- and clotting-times and of the numbers of platelets, red cells, and white cells ; both at rest and after exercise these were within normal limits. All observations thus pointed to the same conclusion : that a man without a spleen could still be placed in the highest grade of fitness for military service.

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## Clinical and Other Notes.

### RESULTS OF VACCINATING 268 B.O.R.s UPON THEIR ARRIVAL FROM THE U.K.

By Captain J. A. WARD,  
Royal Army Medical Corps.

[Received September 30, 1944.]

#### INTRODUCTION.

THE arrival of a draft of approximately 350 B.O.R.s from the U.K. provided an opportunity to carry out a small investigation on the results of vaccination with Indian lymph after recent vaccination with British lymph. Every B.O.R. on these drafts was vaccinated within twenty-four hours of his arrival in Delhi. The method used in each case was that described in the pamphlet "A Note on Vaccination," dated August 1, 1942, issued by the Medical Directorate G.H.Q. (I). Prior to being vaccinated each man was questioned regarding the results of his previous vaccinations in the U.K., his A.B. 64 was examined to confirm dates and results, when these were recorded, and his arm was inspected for scars. Some had been vaccinated immediately prior to leaving the U.K. or while on board ship and were able to produce evidence of recent successful vaccination, e.g. a scab or recent scar. Others were posted before the results could be inspected and these cases are not included in the figures. Altogether 268 men were vaccinated, questioned and followed up and the results recorded.

#### METHOD OF RECORDING RESULTS.

The following types of results may be obtained on re-vaccination :—

- (1) *Immediate (Reaction of Immunity)*.—The broadest areola reached and passed between eight and seventy-two hours after re-vaccination.
- (2) *Accelerated (Vaccinoid)*.—The maximum areola obtained within three to seven days and usually accompanied by a papule or immature small vesicle.
- (3) *Primary (Vaccinial)*.—If previous immunity is *nil* the reaction is the same as after primary vaccination.

The following table gives a summary of the reactions which may be obtained :—

Day after vaccination	Primary	Accelerated	Immediate
1	—	—	Papule
2	—	Papule	No vesicle
3	—	Vesicle	Rapidly fades
4	Papule	Pustule	—
5	Vesicle	Scab	—
8	Pustule	Scab off	—
11	Scab	—	—
16-21	Scab off	—	—
Immunity originally possessed by individual .. .. .	Nil	Fair	Good

Accelerated and immediate reactions have been grouped together and are referred to hereafter as modified (M) reactions.

Primary types of reactions have been referred to as successful (S).

Failures have been denoted by the letter (F).

Modified (M) and successful (S) reactions were recorded in A.B. 64's as being successful results.

The results of previous vaccinations in the U.K. were difficult to obtain. The arms were examined for scars and the A.B. 64's for recorded results but, in a large proportion of the cases, no result was recorded in the A.B. 64, and, in the absence of scars to prove a successful recent vaccination, the result had to be based on the statement of the patient himself. Since the existence of modified reactions was not appreciated by the men, it is probable that some of the results recorded as failures in the U.K. were really modified reactions although great care was taken to sift the results.

TABLE OF SELECTED CASES

No.	Rank	Name			Previous vaccinations in the U.K.	Vaccination in India	Remarks
1	Pte.	E.	..	..	Oct. 43 (S)	— 14.1.44 (S)	
2	Pte.	H.	..	..	Infancy (S)	15.3.43 (F)	8.11.43 (F)
3	WOI.	S.	..	..	1922 (S)	8.11.43 (F)	14.1.44 (M)
4	Cpl.	A.	..	..	Infancy (S)	21.6.40 (F)	5.11.43 (F)
5	Pte.	C.	..	..	Infancy (S)	26.2.43 (F)	— (S)
6	Pte.	P.	..	..	Infancy (S)	16.4.43 (F)	8.11.43 (F)
7	Pte.	S.	..	..	1931 (S)	5.9.42 (F)	26.9.42 (F)
8	Sjt.	D.	..	..	Dec. 39 (S)	No. 43 (F)	— (M)
9	Cpl.	H.	..	..	Infancy (S)	8.1.43 (F)	— (S)
10	Cpl.	H.	..	..	Infancy (S)	1940 (F)	8.11.43 (F)
11	Cpl.	G.	..	..	Infancy (S)	23.11.40 (F)	28.11.43 (F)
12	Sjt.	B.	..	..	Infancy (S)	9.9.40 (F)	8.11.43 (F)
13	Cpl.	C.	..	..	Infancy (S)	23.3.41 (F)	— (S)
14	Pte.	W.	..	..	Infancy (S)	17.12.41 (F)	— (S)
15	Pte.	G.	..	..	Infancy (S)	21.10.42 (M)	— (S)
16	Gnr.	L.	..	..	Infancy (S)	16.4.43 (F)	— (S)
17	Sjt.	J.	..	..	— (F)	Nov. '39 (F)	— (S)
18	Sap.	F.	..	..	Infancy (S)	2.10.42 (F)	— (S)
19	Sjt.	A.	..	..	Infancy (S)	21.7.42 (F)	— (S)
20	Sjt.	I.	..	..	— (F)	9.11.39 (F)	— (S)
21	Sjt.	H.	..	..	1936 (S)	1942 (F)	— (S)
22	Pte.	B.	..	..	Infancy (S)	1942 (F)	— (S)
23	Pte.	B.	..	..	Infancy (S)	— (F)	— (S)
24	Cpl.	H.	..	..	Infancy (S)	22.1.40 (F)	8.11.43 (F)
25	Cpl.	M.	..	..	Infancy (S)	19.3.43 (F)	— (S)

## RESULTS.

- (1) Number of men vaccinated and examined, 268.
- (2) Number of modified reactions (immediate and accelerated), 239 (89.14 per cent).
- (3) Number of primary successful reactions, 28 (10.44 per cent).



(4) Number of primary successful reactions after previous unsuccessful vaccination in the U.K., 24 (8.96 per cent).

(5) Number of first successful vaccinations (never previously vaccinated or last vaccinated in infancy), 4.

(6) Number of failures after three attempts, 1 (0.4 per cent).

(7) Number of modified reactions obtained after failures in the U.K., 75 (27.98 per cent).

(8) Total number of successful reactions obtained after failures in the U.K., 99 (33.20 per cent).

#### COMMENTS ON RESULTS.

(1) 33.20 per cent successful reactions (immediate, accelerated or primary) were obtained after unsuccessful vaccination in the U.K. but, since the vaccinations in the U.K. were either (a) not inspected, (b) not repeated or (c) the results were not entered in the A.B. 64's, it was impossible to confirm the fact that the previous vaccinations were true failures.

(2) The percentage of successful primary reactions, viz. 8.96 per cent, after failures in the U.K. can be confirmed and specimen cases are shown in the table (page 137).

(3) The percentage of modified reactions, viz. 89.14 per cent, is high and it is interesting to note that 99.58 per cent of this small series gave a result. The number of complete failures was very small.

#### CONCLUSIONS.

(1) A considerable number of the B.O.R.s arriving on this draft were unprotected against smallpox, viz. 8.96 per cent.

(2) The number of B.O.R.s who had been unsuccessfully vaccinated in the U.K. appears to be unduly large, viz. 33.20 per cent, but the potential errors in this figure have already been pointed out and definite conclusions regarding the relative efficiencies of the lymph employed cannot be drawn on this account.

(3) It is clear that a large number of these arrivals had not had their previous vaccinations inspected or the results entered in their A.B. 64's.

(4) In one case (No. 1) a successful result was recorded in the A.B. 64 and the patient gave a primary successful reaction with Indian lymph twelve months later.

(5) 11 cases gave a history of a recent failure in the U.K. and produced a primary successful result in India, e.g. Nos. 9, 12 and 16.

(6) Other cases with a history of failed results which had not been inspected gave a primary successful reaction with Indian lymph, e.g. Nos. 17 and 20.

(7) One case had a date recorded in the A.B. 64 but the patient denied having been vaccinated on that date, e.g. No. 23.

(8) The predominant conclusion appears to be that the more successful results obtained with Indian lymph are probably apparent only and mainly due to deficiencies in inspecting, repeating and recording results of previous vaccinations.

#### A QUICK ROUTINE FOR VACCINATION.

By Captain Q. F. EVANS,

*Royal Army Medical Corps.*

[Received August, 25, 1944]

THE following method of vaccination has been evolved for dealing with large numbers of men at once, such as occur at this station where 300-600 recruits form an intake every fortnight.

By this method at least eighty per cent take successfully at the first attempt and practically no faints occur owing to the absence of waiting about.

The speed-up is achieved by : (1) Previous organization ; (2) a double ended vaccinator technique.

## (1) ORGANIZATION.

(a) *No. 1 Orderly* prepares the upper arms : (i) with soap and water ; (ii) with spirit.

This orderly works far enough ahead of the vaccinating M.O.s to allow plenty of time for the skin to dry—say ten men ahead in one queue for each M.O.

(b) *No. 2 Orderly* directs the prepared men into two queues, one to each M.O., and keeps the lines moving steadily according to the individual speed of each M.O. This is a great help. He also watches those men who are liable to wander to both M.O.s by mistake. Men stand with their hands on their hips.

(c) *Vaccination* is then done. The usual quarter inch single scarification being made slowly. The speed-up in technique will be described later.

(d) *No. 3 Orderly* applies the dressing. He stands sufficiently beyond the vaccination M.O.s for the lymph to have dried by the time they reach him—twenty to thirty men ahead.

## (2) DOUBLE ENDED VACCINATOR TECHNIQUE.

Each M.O. is armed with a spirit lamp and a double-ended vaccinator. This consists of a short stick about the size of a pen-holder, a large straight triangular needle is firmly fixed to each end.



The method is as follows :—

The lymph bottle and a pad of cotton wool are held in the left hand, the double ended vaccinator in the right. Both ends are sterilized before beginning.

One end is dipped into the lymph and then put flat on the arm, thus applying the lymph to the skin.

Without removing the needle, and with a tilting movement, the skin is slowly scarified a quarter inch, with the point of the needle through the lymph.

The end of the needle is then wiped with the cotton wool to remove any remaining lymph and then flamed. (Wiping is necessary otherwise the needle gets covered with charred lymph which, though probably sterile, is messy and looks bad).

The double-ended vaccinator is then reversed and the next man done with the other end. Meanwhile the first end is sterile and cooling, ready for the third man, and so on.

This method of application also results in great saving of lymph ; for instance, 480 men have been done with four bottles of lymph (each of which is marked "25 men") with plenty to spare.

These 480 men were vaccinated by two M.O.s in forty-two minutes, with eighty-five per cent successful results.

This is a marked improvement on the twenty-five men per hour suggested by the relevant A.M.D. Bulletin.

## WHAT IS A "BLACK-OUT" ? A STUDY OF FIFTY CASES.

BY Major W. LINDSAY NEUSTATER, M.D., M.R.C.P.,  
*Royal Army Medical Corps.*

[Received June 27, 1945.]

BEFORE the war patients never complained of black-outs, now it is almost a rarity to find one who does not ! The term is used with such a variety of meanings that I thought it of interest to analyse a series of fifty consecutive cases from out-patients, anyone who complained of black-out being included. It took me just two months to collect this series of cases out of a total of approximately 450 soldiers and 100 auxiliaries seen during this period.

## RESULTS.

(1) None of the 50 cases was an officer.

(2) Only 3 were auxiliaries ; therefore they experience fewer black-outs, or else the term is less popular. As I was on the look-out for symptoms of black-out, and I have no notes of auxiliaries describing symptoms of this sort but not using the expression, the former explanation appears the correct one. As women are normally more apt to faint than men, it is not self evident why this is so. A possible explanation is that auxiliaries are referred on account of psychiatric problems resulting from personal relationships and less from strain which is a frequent cause in men.

The cases fell into three distinct groups. (a) 25 who described loss of consciousness, (b) 16 who described a blacking-out of the visual field with no loss of consciousness or hearing, (c) a miscellaneous group of 9 whose symptoms were varied and where the term black-out, was unjustifiable to the point of being ludicrous at times.

TABLE I.—PRODROMAL SYMPTOMS.

	25 "Faints" Group I	16 "Black-outs" Group II	41 cases
Gradual onset .. .. .	11	19	30
Sudden onset .. .. .	14	5	19
Cardiac pain .. .. .	2	1	3
Palpitations .. .. .	2	1	3
Sweating .. .. .	2	1	3
Pallor .. .. .	1	0	1
Nausea .. .. .	2	2	4
Giddiness .. .. .	5	7	12
Headaches .. .. .	3	2	5
Phobias .. .. .	1	2	3
Occurrence of a "Shutter" .. .. .	0	6	6

## POSTDROMAL SYMPTOMS.

Gradual cessation .. .. .	14	6	20
Sudden cessation .. .. .	11	9	20
Headache .. .. .	2	0	2
Fears .. .. .	0	0	0
Automatism .. .. .	—	—	—

## Patients' Estimate of Duration.

Up to 5 secs. .. .. .	4	10	14
5 secs. to 15 min. .. .. .	10	4	14
Half-hour or over .. .. .	9	2	11

Table I shows the symptomatology of the attacks and requires little comment except to point out that claims of faints lasting over half an hour are, unless epilepsy has been missed, quite nonsensical.

Judging from the prodromal symptoms visual blacking-out and fainting are only differences of degree of the same disturbance and, taking these two groups together, the cases fell into certain well defined categories.

(a) 5 cases of faints and 4 of black-out appeared definitely hysterical, i.e. there was absence of a noticeable degree of anxiety, there was obvious motivation and the symptoms tended to be a little too good to be true. Thus, one patient alleged that he was sitting at home when he dropped his cup, could see no one, and asked, "Is anyone here?" Another claimed that the visual field became red, then dark, returning via blue and black

(b) 5 cases were suggestive of epileptic variants though they were none of them typical. Incidentally, as epileptics are usually referred to a neurologist he would have a far higher percentage of this type of black-out than I would.

(c) 1 case might have been a narcoleptic. He stated that, when at College, trying to concentrate on note taking, the pencil would drop from his hand and he would sleep for one or two minutes. He was a worrier who normally slept badly. He had no abnormal physical signs. Although this does not exclude narcolepsy its occurrence during a lecture suggests a more commonplace explanation.

(d) 2 cases were typically migrainous.

(e) The remainder appeared to be psycho-somatic types of disorder, i.e. there were genuine physiological disturbances brought on by emotional or other stress, *vide infra*. Kinnear Wilson has pointed out how, for example, a vasovagal attack can be caused by emotion or, alternatively, be an epileptic variant. In this series all the psychomatic cases gave such a pronounced history of psychoneurosis that they are probably all functional but the following case is an excellent illustration of the complexity of the factors at work.

A clerk of 33 who enjoyed his Army work but was irritable, a poor sleeper, self conscious and solitary. As a child he had had rheumatic fever but no sequelæ. Two years ago, when running for a train, he saw "crescents of black coming down" followed by blackness of a few seconds duration. After three months the black-outs ceased and were replaced by the onset of cardiac pain which radiated down the arms and he experienced pins and needles in both hands and weakness of the grip. At the same time he felt he was choking and was alarmed though there was no fear of death. After the attack he was weak and sleepy and had a pain in the left eye.

The nature and causation of the attacks are best discussed together.

TABLE II.—REMOTE CAUSATION.

	Group I (25)	Group II (16)	41 cases
Past history of fits .. .. .	3	3	6
Past history of head injury .. .. .	4	1	5
Past history of meningitis .. .. .	1	1	2
Previously psychoneurotic .. .. .	21	15	36

IMMEDIATE CAUSATION.

Exertion .. .. .	9	11	20
Heat .. .. .	5	5	10
Emotional upset .. .. .	9	7	16
Two of these factors causal in one patient..	7	7	14

Table II shows the frequency of neurosis already commented on but little else of note in the *remote history*. Except in one case, where the black-out appeared connected with "punch drunkenness," there was nothing to connect the recorded early disorders with the present symptoms. In regard to the *immediate past history* the frequency of exertion, emotion and heat as precipitants—in 14 cases two of these three acting so—is of note. It suggests that the symptoms can be brought about by any stimulant of the autonomic nervous system. It is of interest that not infrequently patients with phobic disorders brought on by a given situation often complain of heat bringing on anxiety symptoms even when the psychological stimulus is absent. The case quoted above is an example of a highly neurotic, although contented and apparently not hysterical individual, whose black-outs were, in the first instance, brought on by effort and then replaced by visceral symptoms of the type seen in effort syndrome and in some cases of migraine.

The nature of the visual black-out is of interest. Some of the more phantastic cases can be dismissed as figments of the patient's imagination but, in others, there may be an actual physiological disturbance. Thus, the crescents of darkness experienced by the patient quoted are not unlike a flicker phenomenon of pulsating blacking-out I have experienced when commencing a game of squash in a brilliantly lighted court when I have started off physically tired—and which I have no reason to suppose were hysterical. An interesting point is that, while a number of patients described the commencement of the attacks as "a shutter coming across the visual field" from above, below and each side, they all described the end of the attack as a gradual return of the whole visual field, objects becoming progressively more defined. These descriptions were spontaneous and it is hard to see why, if the experience were wholly imaginary, there should not have been more discrepancies in the accounts.

The mechanism of such visual disturbances is not easy to explain neurologically, but the same difficulties occur in regard to migraine where the authenticity of the symptoms is not doubted (Kinnear Wilson).

*Group III.*—This miscellaneous group comprised the following cases. 4 patients used the term black-out to denote an obvious hysterical amnesia; 2 meant that they were dizzy; one said that he could not concentrate and another that his legs shook! The remaining case I cite at length as the story is so peculiar and could not be accounted for on known physical grounds yet he did not give the impression of being a hysterical personality. The absence of abnormal findings was confirmed by a neurologist.

The patient, a man of 35, had always been nervous and suffered from a variety of psychosomatic symptoms, e.g. when walking he "often feels his stomach dropping out of his body," when he rises he is apt to sway and "feels he has no energy." He was a sufferer from insomnia, had headaches, palpitations and nocturnal frequency. A year ago he was deafened by gunfire followed by a meatal abscess and became delirious with the temperature. Since then he developed the symptoms he referred to as "black-outs," i.e. he would feel faint and sway; he could not say if he swayed in any particular direction. If he attempted to write when in this condition his "usually neat handwriting became disjointed, irregular and small," it also "strayed off downwards to the right." He had no specimen to show me, nor had I an opportunity to observe him, but, as stated, he did not appear a hysteric, he told his story unaffectedly, made no appeals to the emotion, etc. I can offer no better explanation than some "functional," possibly vascular, disturbance of the cerebellar or extra pyramidal system.

#### DERIVATION OF THE TERM BLACK-OUT.

As the term has come into fashion during the war there are two obvious explanations. One, that the term has resulted from its use in relation to blacking-out when flying. The other, that it might be associated with the black-out in the streets. I therefore asked patients if they could explain why they used the term.

The patient whose legs shook could offer no explanation whatever and I concluded he used the term simply because he thought it sounded impressive. Another said he used the term because it best described his symptoms. Of the remaining 48 none could say where they thought the expression originated, but all of them replied that they had picked up the phrase from a Medical Officer.

#### SUMMARY.

50 cases of "black-out" were investigated. 25 described faints; 16 visual blacking-out but no loss of consciousness; 9 used the term quite haphazardly; 45 patients gave a history of psychoneurosis. Of the first two groups of 41, 9 were hysterics, 5 possibly epileptic, 2 migrainous, 1 conceivably a narcoleptic, and the rest "anxiety states with somatic dysfunction." 48 patients stated they used the term "black-out" because the Medical Officer had used it.

#### REFERENCES.

KINNEAR WILSON, "Neurology." London, 1944, pp. 1570, 1505, 116, and 796.

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### Current Literature.

ADOLPH, W. H., GREAVES, A. V., LAWNEY, JOSEPHINE C., & ROBINSON, H. L. **Nutritional Disorders in Japanese Internment Camps.** *War Medicine.* Chicago. 1944, June, v. 5, No. 6, 349-55.

The dietary conditions and the associated nutritional disorders in five civilian internment camps in the Far East up to the autumn of 1943 are reported here. Two of the camps, located in tropical areas, had been operating for twenty-one months, the other three camps for six to seven months. The rations supplied were generally low in calories and proteins,

and deficient in calcium and vitamins. The available calories ranged from 1,520 to 2,500 and the protein from 45 to 80 grams per head daily, but many individuals were unable to take all the food available. Most of the calories were derived from cereals, usually white flour or polished rice; the vegetables supplied were generally very coarse and appeared to be responsible for much diarrhoea. The intake of calcium varied from 0.12 to 0.44 gram per head daily, and the iron in the diet was very low. No figures are available for the intake of vitamins but it was generally agreed that there was a notable deficiency in the B vitamins.

Clinical observations made in three camps are recorded, and are stated to be typical of all. Oedema resulting from protein deficiency was observed at only one camp, and it affected only the ankles. Beriberi of varying degree was common, but was largely held in check by the limited supplies of thiamin in the camps. Frank pellagra occurred in one camp, and what appeared to be an early stage of this condition in another. Disorders of vision, apparently of neuritic origin, occurred in several camps; usually they failed to respond to any available treatment, though, at one camp, treatment with fresh yeast produced a slow but definite and progressive improvement.

The authors were among the American and Canadian repatriates who returned from the Far East in 1943, but the great majority of the inhabitants of the camps remain there. It is probable that their state is now much worsened, both because of the increased period of undernutrition, and also because the camp stocks of thiamin and other essentials must be exhausted. [See also Zimmer, *et al.*, *Bulletin of Hygiene*, 1944, v. 19, 540.] H. E. HARDING.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

YUDKIN, S. **Hæmoglobin Levels in the Women's Auxiliary Air Force.** *Brit. Med. J.* 1944, Sept. 23, 403-4.

Between May, 1943, and April, 1944, Yudkin carried out a survey of hæmoglobin levels among various groups of W.A.A.F. personnel. Some of the results have been incorporated into the nation-wide survey of hæmoglobin levels initiated by the Hæmoglobin Survey Committee of the Medical Research Council. Most of the subjects were between 18 and 25 years of age, and all between 18 and 35. The average hæmoglobin level on entry was about 95 (standard deviation 9.22), a figure which agrees well with that of Price-Jones for healthy young women. After six months' service the level was 103 (standard deviation 9.12). This level was then maintained approximately unaltered. The coefficient of variation became steadily smaller with longer service. The author suggests that this remarkable improvement is due to the high iron intake of women in the Service, the average intake being 35 mgm. per day. It is clearly important that these observations should be confirmed as soon as possible, since the mean level obtained after service is well above any figure hitherto suggested as normal for women, and both physiologists and clinicians may have to revise their views as to the level of the normal hæmoglobin in large groups of the community. [The standard Haldane scale was used according to which 100 per cent hæmoglobin is equivalent to 18.5 per cent oxygen capacity, corresponding to 13.8 grams hæmoglobin per 100 c.c. blood.]

JANET VAUGHAN.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

LING, T. M. **Industrial Neuroses. Analysis of 100 Cases.** *Lancet.* 1944, June 24, 830-32.

"Neurosis" seems to have lost any diagnostic value and here covers twelve groups which include anxiety states (36 per cent), hysteria (21 per cent), depressive states, mental defect, poor morale, and malingering. Dr. Ling analyses 100 cases referred to a psychiatric out-patient department by medical referees and laments the lack of investigation and treatment in industry as compared with the Forces. He says nothing about the numerical incidence of these troubles but plainly regards them as widespread. In peace-time some of these people,

particularly those suffering from anxiety states, can adjust to suitable or sheltered occupations, others drift from job to job or swell unemployment figures. In war-time unfavourable working conditions light up psychological disturbances or physical disability, but the absence of psychiatric guidance at employment exchanges is, the author thinks, the outstanding problem of the present—which obviously has a close relation to the prevalence of sickness absence. He concludes that an industrial psychiatric service combined with vocational guidance would go far to prevent the majority of industrial misfits that contribute so much to ill-health and national inefficiency to-day.

MILLAIS CULPIN.

*Reprinted from "Bulletin of Hygiene," Vol. 19, No. 12, 1944.*

## Reviews.

**PULMONARY TUBERCULOSIS.** A Handbook for Students and Practitioners. By R. Y. Keers, M.D.Edin., F.R.F.P.S.Glas., and B. G. Rigden, M.R.C.S.Eng., L.R.C.P.Lond. Edinburgh: E. & S. Livingstone, Ltd. 1945. Pp. xi+273. Price 17s. 6d. net.

Success in the treatment of pulmonary tuberculosis depends very largely on early diagnosis. No doubt the increasing use of mass miniature radiography will result in the recognition of a greater number of symptomless cases, but it is his own doctor that the patient will consult when symptoms first develop. The often vague symptoms and indefinite or absent physical signs may make the diagnosis of pulmonary tuberculosis in the early stages a matter of difficulty unless the possibility of the disease is borne in mind.

Every student and practitioner will, therefore, be well advised to read this book which gives a comprehensive account of modern views on pulmonary tuberculosis, including methods of treatment, presented in an interesting manner.

As is essential with works of this nature the book is well illustrated with a series of excellent X-ray plates demonstrating the different types of pulmonary tuberculosis, the results of collapse therapy and differential diagnoses.

Although written primarily for students and practitioners, the book certainly merits a place among the standard works on the subject.

**MANUAL OF TROPICAL MEDICINE—MILITARY MEDICAL MANUALS NATIONAL RESEARCH COUNCIL.** Philadelphia and London: W. B. Saunders Company. 1945. Pp. xix+727. Price 30s.

As stated in the introduction, this volume has been produced under the auspices of the Division of Medical Science of the National Research Council to furnish the Medical Departments of the U.S. Army and Navy with compact presentations of necessary information in the field of military medicine.

The imposing list of American experts in the field of tropical medicine shown as collaborators in the production of this work prepares one for the very high general standard of this manual.

One's immediate reaction on opening the book is admiration for the quality of the paper and excellence of the many illustrations which it contains. The pictorial diagrams illustrating the epidemiology of each of the tropical diseases are of very special value and should help to emphasize the importance of the preventive side of tropical medicine. If more attention were paid to this aspect of disease in the tropics there would be many fewer cases requiring treatment. The print is sufficiently large to be read in comfort.

Besides covering the whole field of diseases peculiar to the tropics and subtropics, there are sections on helminthic diseases, nutrition diseases, arthropods of medical importance and on laboratory diagnostic methods.

The dysenteric group of diseases are very adequately dealt with. Sulphadiazine is put first in the order of effectiveness in the treatment of bacillary dysentery. The necessity for the maintenance of a large urinary output in order to avoid renal complications due to precipitation of the drug in the renal tubules is stressed. In amœbic affection of the colon, treatment with parenteral emetine is recommended and E.B.I. orally is not advised; a view which is not generally accepted by authorities in this country.

The section on helminthic diseases is very complete and contains at the end a useful summary of information on the drugs employed in the eradication of these worms.

This small volume contains all the essential information on tropical diseases presented in a concise and most attractive form. It can be very strongly recommended as one of the books that should be in the library of anyone who is likely to have to deal with such conditions. The emphasis placed on the preventative side should prove very beneficial to those working in the tropics.

**THE ESSENTIALS OF CHIROPODY.** By Charles A. Pratt. Member of the Chartered Society of Physiotherapy. London: H. K. Lewis & Co., Ltd. 1945. Pp. xii+156. Illustrations 34. Price 10s. net.

The first four chapters, devoted to the general anatomy of the foot and ankle, are presented adequately and along routine lines.

Chapter five deals with the skin and its appendages in a simpler way.

Chapter six describes the structure and function of the arches of the foot. This chapter is short and presents the old and generally accepted principles. It does not take into consideration any of the more recent investigations into the question either as regards the actual existence of the so-called anterior transverse arch or the functional part played.

The airing of such modern attitudes is, of course, outside the scope of a book primarily intended for beginners but the handing down of theories from textbook to textbook without any hint of an old-standing theory being questioned is unfortunate. This perpetuation of "theories" tends to establish such theories on the basis of facts through constant repetition.

It would have been useful had the section (Chapter VII) dealing with footwear given more detail regarding boot and shoe fitting. Advice on this highly practical and important subject would seem to be definitely within the scope of the chiropodist. A description of the build up of a shoe or boot, the number of "fittings" and what the "sizes" mean would be of immense practical value.

Chapter VIII onwards deals with treatment and is excellently illustrated and entirely orthodox in its therapy.

The book is very well produced and should form an excellent textbook for beginners in this important subject.

**FRACTURES AND ORTHOPÆDIC SURGERY FOR NURSES AND MASSEUSES.** By Arthur Naylor, Ch.M., M.B., M.Sc., F.R.C.S.Eng., F.R.C.S.Edin. Edinburgh: E. & S. Livingstone, Ltd. 1945. Pp. xii+288. Price 16s. net.

This textbook of fractures and orthopædics written for nurses and masseuses is comprehensive, well informed, extremely conscientious but uninspired. If one considers that a condensed version of a medical student's textbook, which also retains the medical student's attitude to the subject, is desirable for teaching nurses then this book deserves high praise.

If, on the other hand, one considers that nurses and masseuses need a special book written from an original viewpoint then this volume fails to fulfil this requirement.

The approach which the reviewer would like to see in a textbook for nurses is seen in the description of such a simple procedure as the three-handkerchief method for fractures of the clavicle. It is more important that a nurse should understand this than the technique of vitallium cup arthroplasty of the hip, because she is likely to have to treat these cases herself.



Yet reading the description in this book she would be very mystified to find out exactly where the three handkerchiefs actually go.

Similarly she is likely to be closely connected with the maintenance of a fractured femur in skeletal traction with Thomas splint and knee flexion piece ; but this popular method is not illustrated and more space is given to Hamilton Russell's and Hodgen's methods which are much less commonly seen. Though she may read how to apply plasters as well as a doctor she will still be as ignorant of the mechanical principles and the nursing of a case on a Jones' abduction frame as the average medical student.

These criticisms apply only to the scope and balance of the book ; as regards the material and methods the book is punctiliously correct and should be useful for medical students as well as nurses.

THE ELEMENTS OF MEDICAL TREATMENT. Fourth Edition. By Sir Robert Hutchison, Bart., M.D., D.Sc., LL.D., F.R.C.P. Bristol : John Wright & Sons, Ltd. Pp. 213. Price 10s. 6d. net.

Now in its fourth edition, this excellent little book has been completely revised in view of recent advances in the treatment of medical diseases. Nevertheless, it still deals mainly with the principles of elementary therapeutics and, as the author points out, it is "largely designed to instruct the student in the fast disappearing art of prescribing," which it succeeds in doing delightfully. Although the author does not claim to describe the detailed treatment of all forms of disease, there are few medical conditions encountered in ordinary practice which are not dealt with. There is a new chapter on Chemotherapy, which includes a note on penicillin and a useful table of the dosages for adults and children of the sulphonamides in severe and more moderate infections. The chapter on Endocrine Treatment has been rewritten—it seems a pity to find the sole reference to Graves's disease in a section which is concerned only with endocrine therapy and, apart from a brief reference to thiouracil, contains no information on the general management or adjuvant treatment of such cases ; and this also applies to Addison's disease. There is a nice section on the indications for and essential details of Physiotherapy. Taken in all, this book can be highly commended to the student and the practitioner. It is well got up and is printed in pleasantly large type. From the Service doctor's viewpoint, its size presents no transport difficulties.

A HANDBOOK ON DISEASES OF CHILDREN. Fourth Edition. By Bruce Williamson, M.D., F.R.C.P. Edinburgh : E. & S. Livingstone. Pp. xii + 388. Price 12s. 6d. net.

The new edition of this little book has been most admirably produced. It covers the field of pædiatrics in an attractive manner which is brief and essentially practical. It is profusely illustrated, and we are warned in the preface that we must form our own opinion concerning the coloured plates. The first of these is a beautiful photograph ; the others might well be omitted, especially the coloured drawing which is said to illustrate measles. The plain photographs are mostly excellent, but some of them are out of focus. The modern student will be surprised when he reads that leeches should be applied to the upper part of the right chest of an infant with dyspnoea, cyanosis, and distension of the right heart, and he will be bewildered by the author's insistence that all children with "intrinsic tachycardia," no matter what the cause, should be digitalized. Many dogmata such as this may be found here, but in a small volume dealing with a large subject dogmata are only to be expected, and this book is well written, most readable, and provides much food for thought.

THE TREATMENT OF MENTAL DISORDERS (ANCIENT AND MODERN). By Richard Eager, O.B.E., M.D., Ch.B. Exeter : Cole & Sons. 1945. Distributing Agents, H. K. Lewis & Co., Ltd. Pp. 100. Price 7s. 6d.

This small volume, published "in commemoration of the centenary of the building of the Devon Lunatic Asylum (1845)," is written by a former Medical Superintendent of that Hospital. The first part of the book tells the familiar story of the Mental Hospital move-

ment in this country, from the founding of Bethlem Hospital in 1247; through the centuries of restraint, chains and torments; the period of Humane Reform associated with Pinel, Tuke and others; to the period of legislative reform initiated by the Lunacy Act of 1890 and culminating in the Mental Treatment Act of 1930. There follows a detailed history of the Devon County Lunatic Asylum which was opened in 1845 under the direction of Dr. J. C. Bicknell, the first editor of the *Journal of Mental Science* and first president of the Mental After-Care Association.

It is in summary a book of local rather than of general interest.

MANUAL OF PSYCHOLOGICAL MEDICINE FOR PRACTITIONERS AND STUDENTS. Second Edition. By A. F. Tredgold, M.D., F.R.C.P. London: Baillière, Tindall & Cox. 1945. Pp. 308. Price 18s.

This volume is an admirable summary of what many people still call psychological medicine, and Dr. Tredgold has completely revised the first edition which, we read, sold out in a few months.

New paragraphs appear on pitressin in the diagnosis of epilepsy, on cerebral malaria, on disorders due to vitamin deficiency, on mental disorder in Parkinsonism, on the operation of prefrontal leucotomy and on alterations in the Law regarding divorce in relation to insanity and infanticide. We have known this book since it was first published in 1943. It is fairly described as a "*multum in parvo*"; every sentence conveys information. Here in a handy edition is a whole realm of psychiatry from the psychoneuroses to the rarer senile and pre-senile conditions such as Pick's disease and Alzheimer's disease. Dr. Tredgold uses the term "Primary Dementia" for that inherent lack of durability of cortical tissue which leads to degeneration at an earlier age than is normal. There are some excellent chapters, especially in the section on mental deficiency and the legal relationships of insanity. As a practical handbook for students and practitioners this book is quite outstanding and is a mine of up-to-date information. The war neuroses are dealt with both in soldiers and civilians, but rather in terms of the 1914-18 war than from the modern outlook on the neurotic soldier. Little is said about the well tried first-aid psychiatric treatment on battlefields that has done so much to minimize the psychiatric casualties of this war.

Dr. Tredgold is to be congratulated on his second edition, which is an undoubted improvement on the first. The reviewer has tested the index without finding any error.

THE TREATMENT OF ACUTE INTESTINAL OBSTRUCTION. By Judson T. Chesterman, M.R.C.P., F.R.C.S., F.A.C.S. London: J. and A. Churchill, Ltd. 1945. Pp. viii + 116. Price 10s. 6d.

Intestinal obstruction, viewed from all its aspects, is a huge subject. The literature on its pathology and biochemistry alone is enormous. Mr. Chesterman has here endeavoured to put the whole story into a slim volume of little more than a hundred pages, for the addition of the word "Treatment" to the title is a superfluity not confirmed by the comprehensive contents. The volume is not a monograph; it is a condensed textbook. For pathology, diagnosis, including X-ray diagnosis, and treatment in general terms, all of which take up the first half of the book, are followed by brief consideration of the causes and treatment of the numerous forms in which obstruction may take place.

In the initial section on the pathology of simple obstruction he sums up the evidence presented as to the cause of death and regards the only two proven factors as those of fluid loss, in all its forms, and viability of the bowel. He discusses next the pathology induced by the release of acute intestinal obstruction, as to the reactions being either due to fluid loss or to some toxic factor. If there is a toxin produced he thinks it may be of the same nature as that shown by Green and others following the release of limb ischæmia and called by them the muscle shock factor.

The radiographic evidence of obstruction, the author cautions, must only be regarded as

of value when all the other possible evidence is taken into account. It seems to us that his differential diagnosis of the site and degree of obstruction and of simple obstruction as against strangulation on the basis of symptoms is largely academic as compared to the value of the balance of probability on grounds of age, previous history, hernial orifices and scars.

The author is more at home in his general considerations of treatment. He enters in detailed fashion into the replacement of fluid loss and to the use of the decompressing suction tube. The widespread use and value of the latter in war surgery will undoubtedly popularize further its employment in civil practice. A good description of its uses is probably the best section in the book. The author's preferences in anæsthesia are spinal analgesia, using hypobasic nupercaine, in good risk cases, general anæsthesia with ether and oxygen in bad risk cases, and local anæsthesia for the worst risks of all. The section on operative and post-operative management follows orthodox lines.

There is little comment to be made on the second half of the book with its description of the various types of obstruction. These conform to ordinary textbook descriptions.

It is a little difficult to see why the author has presented his subject in the way he has done. It seems to us that he would have been better, in showing his undoubted knowledge of and interest in his subject, either to publish a full-blooded exposition of the subject on a larger scale, more profusely illustrated, or to content himself with a few articles, in surgical journals, outlining his personal views. His style of exposition is not always clear, he is prone to clichés, and his proof correcting has been faulty. (Such words as "duodental," "distension" and "ideal," for "ileal," are irritating.)

Nevertheless, as a book of reference, and as a condensation of a big subject, it has value, and, as already said, the sections on the general management of intestinal obstruction are excellent.

DOCTORS AT WAR. Edited by Morris Fishbein, M.D. New York : E. P. Dutton & Company, Inc. 1945. Pp. xiii + 418.

We have received, on loan, from the American Library, U.S. Office of War Information, a copy of the above important work.

The Editor makes no exaggeration when he states that the volume will occupy a unique place in the medical documentation of the war.

The book covers a wide field of subjects by contributors, civil and military, all prominent medical men of America, who describe the work which they so ably directed during the war years. It records the splendid achievements of their Medical Services which we know so well and admire and of which this work portrays but a part.

#### I.A.M.C. JOURNAL.

We have received the second number of this Journal, published in July, 1945. The high standard set by the first number has been maintained. In its present form this Journal must have a strong appeal to all Ranks of the I.A.M.C.

There are some interesting and authoritative professional articles.

Lieutenant-Colonel S. Shone writes on "Red Cell Formation and Anæmia," with particular reference to the anæmia following chronic malaria.

Lieutenant-Colonel H. G. Garland has a paper on "Current Views on Sciatica." He is a firm believer in regarding a prolapsed disc as the usual cause of a true sciatica.

Major J. D. Hardy and Major R. Passmore are responsible for a very useful article on Kala-Azar, on which a good deal of work has been done during the war.

Major A. L. Craddock in a Review of "Post-Arsenical Jaundice and Related Types," sums up as follows :—

(1) Post-arsenical jaundice is due to transmission of an icterogenic agent by contaminated syringes.

(2) This jaundice is related to that transmitted by human blood products generally.

(3) There is some evidence that this jaundice and infective hepatitis are closely related and may have a common cause.

(4) It has been suggested that they are really two separate conditions (X and Y diseases). This view was based partly on the widely different incubation periods, but another writer has challenged this on the ground that the latent period in X disease may, in fact, be as long as in Y disease.

(5) The implications of this are discussed and some suggestions put forward for further experimental investigation.

Lieutenant-Colonel Stewart MacDonald contributes a very practical paper on "The Autopsy in Anæsthetic Deaths."

A Report on a "Malaria Therapeutic Trial in Assam" is well worth reading. *Inter alia* it is concluded that "Pamaquin after a light Mepacrine treatment appears to have a definite effect in reducing the relapse rate."

Book received:

ACHIEVEMENT IN THE ART OF HEALING. By John Langdon-Davies. Achievement Books No. 4. General Editor: Noel Carrington. London: The Pilot Press, Ltd. 1945. Pp. 36. Price 2s. 6d.

We have received the following reprints, which have been forwarded to the Library, Royal Army Medical College:—

- (1) STUDIES ON THE RELATION OF THE CLINICAL MANIFESTATIONS OF ANGINA PECTORIS, CORONARY THROMBOSIS, AND MYOCARDIAL INFARCTION TO THE PATHOLOGIC FINDINGS, By Herrman L. Blumgart, M.D., Monroe J. Schlesinger, M.D., and David Davis, M.D. *The American Heart Journal*, Vol. 19, No. 1, January, 1940.
- (2) ARTHROPOD-BORNE DISEASES. By Captain Saul Jarcho, Medical Corps, U.S. Army. *War Medicine*, Vol. 3, Nos. 5 and 6, May and June, 1943.
- (3) (a) THE RICKETTSIAL DISEASES. By R. E. Dyer, M.D.  
(b) THE ACUTE DIARRHŒAL DISEASES. By Albert V. Hardy, M.D., and James Watt, M.D.  
(c) PRESENT-DAY PROBLEMS OF MALARIA INFECTIONS. By Mark F. Boyd, M.D. (Symposium on Tropical Diseases.) *The Journal*, American Medical Association, Vol. 124, No. 17, April 22, 1944.

### Notices.

Army Council Instruction 912 of 1942 legislates for the retention on the Active List of officers holding permanent regular commissions who attain the age limit for retirement.

Paragraph 4 of the A.C.I. legislates for the substantive promotion, in exceptional cases, of officers so retained. It has been ascertained that this provision is applicable also to Colonels retained supernumerary after completing four years in the rank. All such are considered therefore by the A.M.D. Selection Board when an officer is selected to fill a vacancy for substantive Major-General.

### LORD MAYOR TRELOAR CRIPPLES' HOSPITAL & COLLEGE. ALTON AND HAYLING ISLAND, HANTS (400 BEDS).

APPLICATIONS are invited for the post of Resident Medical Superintendent of the above Hospital. Candidates should be under the age of 45, and must have senior surgical qualifications and should be experienced in orthopædic work. Applicants should write to the Secretary for information as to salary and emoluments, sending copies of testimonials and full particulars of professional experience.

## EDITORIAL NOTICES.

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# Journal of the Royal Army Medical Corps.

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## *Original Communications.*

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### FLY PREVENTION: SOME SUGGESTIONS AND OBSERVATIONS FROM A GENERAL HOSPITAL IN NORMANDY, 1944.

By Colonel J. BRYAN FOTHERINGHAM,  
*Late Royal Army Medical Corps.*

[Received April 17, 1945.]

#### INTRODUCTION.

THESE suggestions and observations are put forward as an attempt to help in lowering the incidence of fly-borne diseases in theatres of war—an important aspect of Preventive Medicine. The notes were written in September and early October, 1944, and, on the advice of the Deputy Director of Hygiene, 21 Army Group, are now submitted for publication in THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

#### COMMENTARY.

74 (BR) General Hospital (600 beds plus three one hundred beds expansions) arrived at its present site on July 11, 1944, and was a busy hospital within a few days time. The first few weeks meant a "flat-out" effort by all ranks. During our first seven weeks we dealt with only two less than five thousand patients and our cases were naturally mainly surgical. A busy hospital does NOT run itself nor can it work efficiently unless the best use is made of its personnel and attached Pioneer Corps personnel. Our sanitary personnel consisted of three R.A.M.C. Other Ranks assisted by untrained Pioneers. I also employed carpenters and plasterers in making fly traps, strainer tins for the soakage pits, wooden lids for these tins, pot racks for kitchens, fly-proof safes, concrete seals and other improvised sanitary equipment.

The trapping of flies directly from deep trench latrines is not new. I described this and other aspects of fly prevention in an article submitted in 1943, for publication in THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. The details of the bin lids mentioned in that article have, I understand, been sent to hygienists of 21 Army Group as a technical instruction. I regret I cannot have some of these bin lids for my swill bins here! I found them most useful in the M.E.F.

Since our arrival in France and up to the present date (October 3, 1944) there have been no cases of dysentery in this unit. The hospital for a time had one hundred beds allotted for dysentery patients, so we must consider ourselves lucky. There have been only three admissions to hospital with diarrhoea. The health of the whole unit has been very good although we have had from time to time mild cases of gastro-enteritis not requiring admission to hospital. The ratio per 1,000 of other ranks of the unit reporting sick since arrival in France averages 6.5 for the period.

The sanitary "products" of 74 (BR) General Hospital have been seen by many hygiene officers, including the D.D.H., 21 Army Group (Colonel W. W. S. Sharpe) and the A.D.H. (Lieut.-Colonel P. H. R. Anderson).

It is hoped that some of these suggestions may be of help in fly prevention. D.D.T. may be the answer to many of our fly problems but it is not yet available to any extent and supplies are strictly limited.

It is considered that our hygienists do not receive enough support from many R.A.M.C. officers who are frequently not interested in hygiene and whose knowledge of field sanitation and sanitary discipline is frequently lamentably low.

I think I can claim to be "hygiene-conscious." A few days ago I swatted a fly, well and truly, with a copy of the "Handbook of Military Hygiene, 1943"; then smiled, relaxed and proceeded with the writing up of these notes!

#### SHALLOW TRENCH LATRINES OR OIL DRUM LATRINES.

It is suggested that shallow trench latrines are a much greater source of fly breeding than lightly buried unburnt food tins or neglected swill bins. Five-gallon oil drums can be used as an alternative to shallow trench latrines, pending the provision of deep trench latrines or disposal of faeces by incineration. It is, too, a simple matter to make fly-proof seats with self-closing lids for these oil drums. The five-gallon oil drum is eighteen inches in height and makes a convenient and comfortable latrine. Personnel should be instructed to urinate in a temporary urine soakage pit before using the oil-drum latrines.

The lid of the drum should be carefully cut close to the rim with a cold chisel and the cut surface hammered smooth. This only takes a few minutes to do and the cut drum lid should be saved.

When the drum is two-thirds full of faeces it is taken out of action and some fifteen bully beef or similar tins added to its contents. These tins do not require to be incinerated but must be pressed down firmly into the faeces with some sort of "punner."

A full bucket or rather more of well mixed earth and oil is then added and well rammed down with the punner. The drum lid is replaced when the drum is nearly full and more oil and earth added.

The contents of the oil drum can then be cemented over but this is not necessary unless the oil-drum latrines are being transported for disposal.

These oil and earth sealed oil drums are easily disposed of by burial in a trench two feet deep. They should be placed close together in the vertical position, covered with more earth and oil well rammed down, and the area marked "Foul Ground."

Non-returnable four-gallon petrol tins can be used as latrines, sealed in a similar manner and disposed of in the same way.

It is considered that shallow trench latrines are unhygienic anachronisms.

#### OTWAY PITS.

Otway pits are frequently required if full incineration of faeces is not being carried out or where incineration is impracticable. I have used Otway pits in the Middle East and in Normandy and, as in most cases the contents (faeces from bed-pans of diarrhoea, dysentery and other patients) are mixed with cresol solution, have not found fly breeding in these pits. In my experience a fly trap on an Otway pit is unnecessary. Here in Normandy 74 (BR)

General Hospital have two Otway pits to deal with the fæces from the Surgical Division and a further two some hundreds of yards away for the Medical Division.

As the only materials available shortly after our arrival were tree trunks, compo boxes, biscuit tins, sacking, and oil from a not-too-distant aerodrome, these Otway pits were constructed by attached Pioneer Corps as follows :—

(1) Pits 10 ft. to 12 ft. long, 3 ft. wide, and 6 ft. to 8 ft. deep were dug and, although we struck rock on several occasions, we met no sub-soil water.

(2) Trees were felled and stout beams cut a few feet longer than the trench. These beams were then placed lengthways over the pit and the ends countersunk to ground level.

(3) Compo box lids or any available packing case wood were nailed over the logs and a fæces chute made from a biscuit tin placed centrally over the pit.

(4) Oiled sacking was then placed over this platform to extend two feet (no, not four feet !) beyond the limits of the pit. Four feet of sacking round pits were unnecessary in this hard clay soil.

(5) The whole was then covered by an earth and oil seal and a loose fitting lid with long sides placed over the fæces chute.

(6) Later, and as early as possible, these pits were covered with a layer of concrete made from "acquired" or gifted cement plus sand laboriously brought to the site by unit transport.

To begin with we made an Otway pit for each Division and as soon as possible duplicated them. When one pit is full the fæces chute is sealed with a thin layer of concrete and the other pit taken into use. They have been alternated for use every three or four weeks.

When instructing Pioneer Corps personnel to dig Otway pits always ask for the well-nigh impossible, i.e. to have the pit two feet wide and eight feet deep. If you do not do this they will make the pit some 4 feet wide at the top ! Also one should see that they dig embrasures in each corner and thoroughly loosen the soil at the bottom of the pit to help drainage. The construction of Otway pits requires constant supervision.

One of our Otway pits did not have a concrete seal for many weeks and its oil and earth seal was merely "muttied" over. It functioned as well as the others but muttie seals require some maintenance and are not easily kept clean as are concrete seals.

All four Otway pits have worked admirably, have been no attraction to flies and have given off no offensive smell. Latterly we have removed the fæces chute biscuit tins and made concrete fæces chutes. Fig. 1 shows a concrete covered Otway pit with its concrete fæces

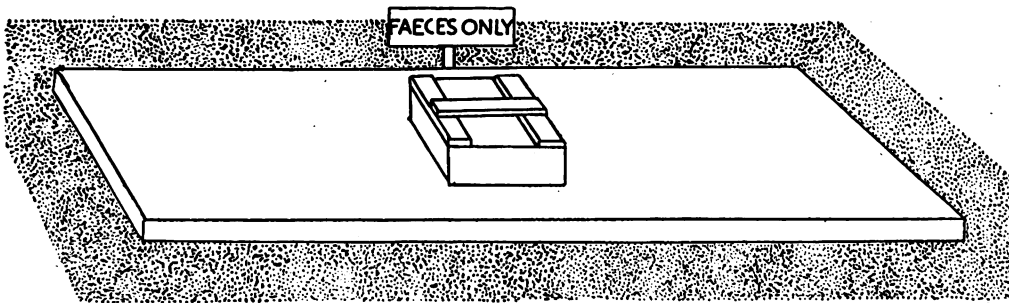


FIG. 1.

Otway pit with concrete seal, fly-proof cover and sand surround.

chute covered with a loose-fitting wooden lid with long sides which rest on the concrete platform and NOT on the raised chute. This lid ensures that even the most careless nursing orderly should replace the lid properly. When sand is available a layer of sand is laid for two feet round each Otway pit and covered soakage pit. This helps to keep them cleaner and there is less mud in wet weather.



Forty-gallon pitch drums make very efficient temporary Otway pits should such pits become filled by water seepage during prolonged wet weather and when, for any reason, incineration of faeces is impracticable. I found by experiment that it was easy to cement seal a forty-gallon pitch drum two-thirds full of water and thus equally easy to seal a drum two-thirds full of bed-pan contents.

To seal each bin the following steps are taken :—

- (1) Add two full sacks of small tins (milk, or 2 lb. tins) to the contents of the drum and press down firmly with a "punner."
- (2) Add earth until drum is nearly full.
- (3) Stamp the earth down hard with the "punner" until the earth level is about four inches from the drum top.
- (4) Add a two-inch seal of oil and earth mixture and level this off.
- (5) Finally add one bucket of cement mixture, level this and leave drum *in situ* until the concrete is hard.

The sealed drums can then be rolled to the nearest foul ground area and left there marked "Bed Pan Contents," or alternatively they can be buried.

The sealing of a bin takes two men ten minutes and is a very simple procedure. Cement drums, although smaller, can equally well be used.

The same technique can be used to seal forty-gallon pitch drums two-thirds full of swill. Admittedly, there is practically no swill when troops are on *compo* rations but on the F.S. ration scale there often is. A recent routine order in this L. of C. Sub-Area instructs us, if there is no contractor, to pass swill through an incinerator and, if this is not possible, to bury it with certain precautions. Unless a very reliable N.C.O. of the Sanitary personnel is supervising such matters as the sealing of deep trench latrines, or sealing buried swill, then fly breeding, except in winter, is bound to occur.

#### SOAKAGE PITS AND GREASE TRAPS.

The standard four feet by four feet soakage pit can be used for at least three purposes :—

- (1) Urine soakage pits to take the urine from wards and from latrine buckets used as urinals. These latter pending the supply of trough urinals by the R.E.
- (2) Sullage water pits for operating theatre, laboratory, dispensary and dental departments.
- (3) Temporary grease traps.

In most cases the soakage pits should be in pairs and far enough apart not to drain into the same patch of soil. These pits should be finished in the usual way with oiled sacking, oil and earth seal and then concrete seal with raised concrete "box" to contain the biscuit or petrol strainer tin which is covered with a wooden lid. Each tin is perforated with numerous nail holes and a strainer made of tin fits into the bottom of each perforated biscuit or petrol tin. All soakage pits should be used on alternate days to help the drainage problem (fig. 2). If these pits are to function properly attention must be paid to the following points :

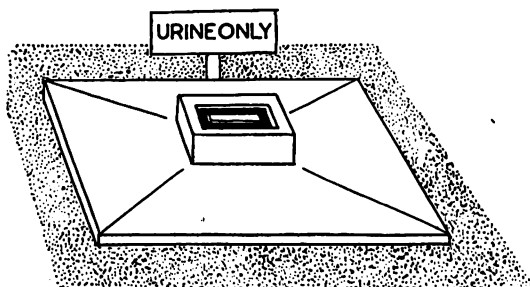


FIG. 2.

Urine soakage-pit with concrete seal, fly-proof cover and sand surround.

(a) The digging of embrasures and the loosening of the soil at the bottom of the pit and careful grading of the stones which fill it. If not carefully supervised one frequently finds the Pioneer Corps or R.A.M.C. fatigue parties put the small stones at the bottom and the large boulders at the top of the pit ! More waste of time and labour.

(b) That the oiled sacking fits carefully from two feet beyond the sides of the pit to close to the sides of the strainer tin. If there are gaps in between the pieces of sacking then part of the earth seal often works its way into the soakage pit and helps to block it. In fact seals the pit in the wrong place ! Oiled sacking should therefore overlap.

(c) That the wooden lid over the strainer tin should be loose fitting with long sides and be fitted with a handle, preferably of the flat variety. If not loose fitting, personnel and patients will not replace lids correctly and also wooden lids swell in wet weather. A reserve of lids should be kept.

(d) That the concrete " box," which we reinforced with old Kramer wire, should NOT fit closely to the strainer tin otherwise once again lids will not be replaced properly.

(e) That there should be careful supervision of all soakage pits and good co-operation in their use by unit personnel. The addition of straw or hay to the strainer tin converts any of the soakage pits into grease traps which work well if serviced well and if the head of water is not too great. If strips of sacking are laid between the strainer tin and the concrete " box," and hay or straw placed in this gutter as well as in the tin, then an even more effective grease trap results. In my hospital and unit kitchens the cooks service their own grease traps, change the straw frequently and burn the grease-laden straw in the Soyer stoves. If properly cared for such temporary grease-traps cause no offensive odour. In a M.E.F. desert hospital I commanded in 1941-42, if the cold-water grease traps were not cleaned out twice daily by a R.A.M.C. sanitary orderly and two Egyptian labourers then they became very offensive.

When used as sullage water soakage pits for the operating theatre they have proved most successful. Two pits, used on alternate days, have actually been in use for a very busy operating theatre for well over two months. They have given no trouble, are free from flies and have no offensive odour. This really is rather a severe test for two small soakage pits dug in the clay soil of Normandy.

To sum up some of the advantages of these concrete sealed soakage pits :—

(1) Not difficult to make ; require no R.E. materials other than cement and the latter is not absolutely essential.

(2) Easy to keep clean.

(3) Require the minimum of maintenance.

(4) Comparatively fool-proof if carefully used.

(5) Should not fill up if there be heavy rain and flooding say in the kitchen area.

(6) Do not become offensive if well maintained.

It is important that soakage pits be well sited for drainage and rested every other day.

For nearly three months thirty soakage pits have been in regular use in 74 (BR) General Hospital and they seldom get choked. If so, it has generally been due to some careless individual putting dressings, hay, etc., into the actual soakage pit.

They would be of little value in marshy land or in prolonged wet weather in a clay soil. The stones filling the pit should not be of sandstone which eventually crumbles away.

The amount of water available for patients and personnel during this period has been five gallons per head per day. I held the view that ordinary ablution water, potato water and even urine, if scattered over a wide enough area of pasture land, are dealt with adequately by weathering and do NOT attract flies to any appreciable extent. It's the concentration which eventually becomes attractive.

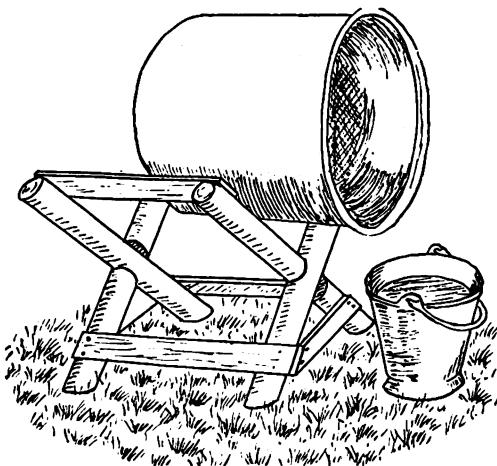


FIG. 3.

Trestle for "Rolling" Soyer stove containers.

Fig. 3 shows a small trestle expressly made for use with containers from Soyer stoves. One man can easily empty and clean a container on one of these trestles and this saves fouling the ground. The washings into a bucket are then emptied direct into a kitchen grease trap.

#### FLY TRAPS OVER DEEP TRENCH LATRINES.

In 1942 I trapped all brick-built deep trench latrines in my M.E.F. desert general hospital by sinking an oblique shaft at one end of each latrine into the actual latrine trench and placing an Ordnance type of box fly trap over these shafts. The black curtains of this type of fly

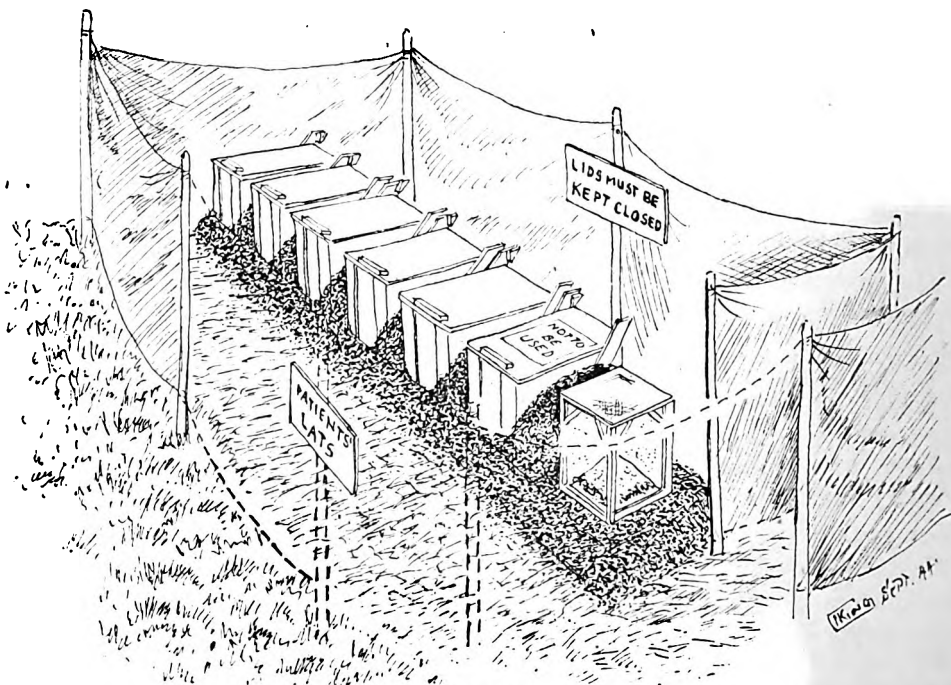


FIG. 4.

Sketch-diagram of compo box latrine, with fly trap directly over deep trench.

trap were removed in order that the maximum amount of light should penetrate the dark latrine and attract flies breeding there. Although these shafts were set at an angle, many of the traps caught massive quantities of flies. My requirements in this type of box fly trap were large and later Ordnance could only supply box fly traps made from non-returnable petrol tins and wire gauze. I found these next to useless as they were too dark.

When 74 (BR) General Hospital arrived in Normandy in early July, 1944, we brought with us several rolls of muslin purchased in England from our hospital fund and this has turned out to be identical to surgical muslin. We tried to bring a supply of sodium arsenite with us but failed to obtain any. We forecast that there would be no breeding of flies in this climate under three or four weeks. Within four weeks of our arrival all our twelve compo-box-covered trench latrines for patients and personnel were trapped with improvised box fly traps made from muslin-covered wooden frames, with muslin-covered wire cones.

Although only one layer of muslin was used to cover these latrine fly traps they stood up to storms and heavy rains very well indeed and caught many flies. The traps were "fitted" at dusk every evening and one Pioneer Corps private carried out daily maintenance of all these compo-box-covered trench latrines. This entailed earthing up and sealing all holes in the latrine superstructure, repairing seats, keeping as much as possible the lids self-closing, and also sanding the entrance and area between latrine screen and seats to prevent too much mud adhering to the boots of patients and personnel during rainy weather.

The seat next to the latrine fly trap was nailed down and a "NOT TO BE USED" notice tacked over it (fig. 4). This was done to prevent anybody using this seat and leaning on the fragile fly trap.

The latrine entrance should be at the opposite end to the fly trap for protection of the trap and not as in sketch. Strangely enough there was no sabotage of latrine fly traps or of baited muslin covered fly traps placed in latrines or near kitchens. The first latrine fly trap functioned well for seven weeks before requiring maintenance for a small hole due to "fair wear and tear." Of course, they all required careful inspection daily and were "fitted" each evening.

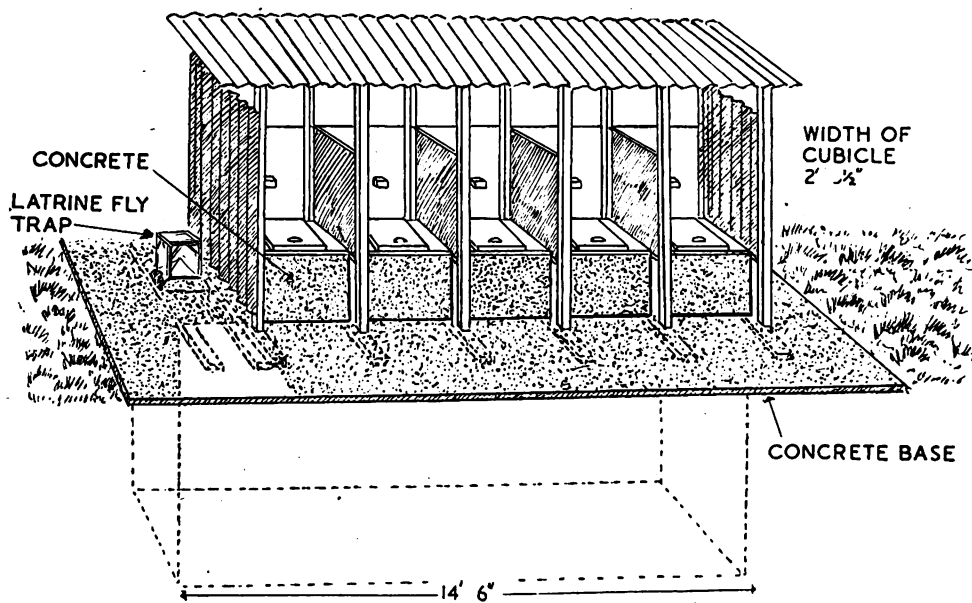


FIG. 5.

Suggested concrete covered deep trench latrine, with wire gauze box fly trap directly over latrine trench. A strand of wire over the fly trap retains it in position in high winds.

It is important that the latrine fly trap be set directly over the latrine trench and that the base of the cone be as large as possible.

The number of flies caught in one latrine type fly trap in use for seven weeks was 21,540.

Other latrine fly traps had similar heavy catches of flies. These improvised latrine fly traps worked excellently.

Fig. 5 is a suggested concrete-covered deep trench latrine, with wire-gauze box fly trap *outside* the latrine superstructure. This entails making the trench longer. Practically the only wooden portions of this latrine are the seats, the lids and the thick beam "stops" to make the lids self-closing. Of the many varieties of "stops" I have seen, the thick wooden beam is the best. The wooden seats could be dropped into slots in the concrete. To make the drawing simpler a single-sided latrine has been shown as there was not room on the page to show a twelve feet deep trench! In practice this could be a twelve seats latrine. There would be less chance of the wood warping, no need for urine deflectors and the latrine would remain more fly-proof than those with more wood in their construction. If the ground surrounding the trench for a distance of four feet were dug up to a depth of six inches, the loose earth removed and a layer of oil spread over this area and the area immediately beaten hard with a "punner," then there would be no need to use oiled sacking as the whole area surrounding the trench could then be concreted. The area could, of course, be concreted for six feet all round the trench if so required to meet the specifications of the flooring and roof superstructure.

It is not considered that even the lustiest of maggots could burrow far through Normandy clay! The latrine shown in fig. 5, however, is suggested as being suitable for many soils in many climates. Few deep trench latrines remain fly-proof for long and they are often dangerous sources of fly breeding.

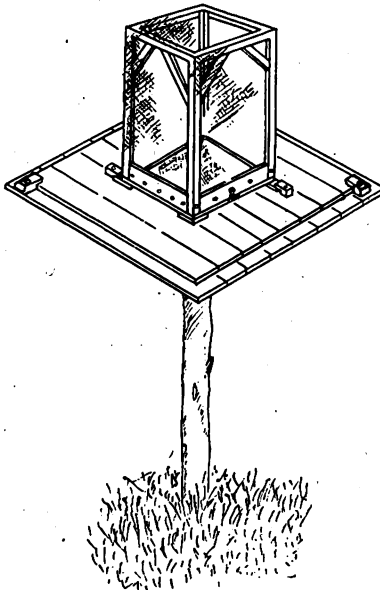


FIG. 6.

Improved box fly traps.

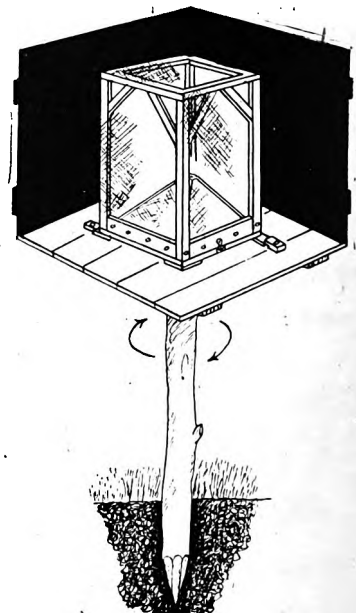


FIG. 7.

#### IMPROVED FLY TRAPS.

Fig. 6 illustrates our standard improvised baited box fly trap. The box and cone should be covered with two layers of muslin or surgical gauze as we found that wasps, when captured,

could force their way through one layer of muslin and thus render a fly trap unserviceable. The box can be removed from the cone if the catch is to be cleared or to examine any particular flies caught. Two "buttons" prevent the trap from being blown off the stand or "landing ground" which should be reasonably wide and painted white or whitewashed. Gum Arabic can be used as size when making up whitewash. The fly trap and landing ground can be moved about inside or outside a cookhouse or placed on a sundial type of stand. This latter is a useful type of stand when placing fly traps behind swill bins or in a corner of a latrine; not *on* a latrine. Of course, D.D.T. will probably make such traps obsolete but, well, we had no D.D.T. and were unable to obtain any.

We have used muslin-covered fly traps in 74 (BR) General Hospital near our cookhouses and latrines for many weeks and they have proved very successful. As a routine, of course, they are "flitted" each evening at dusk to prevent flies escaping from the traps during darkness. I found in the M.E.F. that part of a catch could escape during the night if not "flitted." The bait should be removed from under the trap when "flitting" the catch.

There are some interesting figures in comparing catches from latrine type fly traps, trapping flies breeding in deep trench latrines, and catches in baited traps sited near cook-houses.

(A) One latrine type fly trap = 21,540 flies caught in seven weeks.

(B) One cookhouse baited fly trap = 2,875 caught in seven weeks.

The catches in other latrine type and cookhouse type fly traps were approximately similar to those given here.

Fig. 7 is my idea of a similar improvised fly trap which might be useful under field conditions in the Middle and Far East if D.D.T. were not obtainable. It is considered that both sides of the windscreen should be painted black and the landing ground white. In the early part of the day the trap should be turned to the sun, but in very hot weather the windscreen should be turned to keep the trap in the shade. Thus, when the sun is killing off flies, this trap in the shade, if serviced with suitable food and drink, cannot help but catch flies. By the way, flies dislike the smell of fresh white paint so a freshly painted landing ground must have time to weather. It can equally well be whitewashed.

#### BAIT FOR FLY TRAPS.

It is regretted that one cannot bait even out-door fly traps with faeces or pus from plaster cases. Both would make excellent bait. In the M.E.F. my stock bait was "fresh fish gone high." Sardines left out for days to get "high" were tried here but flies were not interested. There were no chicken entrails, no fish and no beer! Jam and syrup encouraged wasps so "fresh meat gone high" became our standard bait. As a bait it is attractive to flies, but care must be taken to trap maggots from such bait. It should be turned over daily as the surface exposed to the sun soon dries up and must be kept moist.

Fresh urine as a bait for flies is useless in temperate climates. I do not believe that flies, unless of some special species, are interested in fresh urine except when they are really thirsty. Of course, in hot climates flies quickly die without water but even then I wonder if flies really prefer to drink fresh urine to water! For years I have felt it hygienically "half-wrong" that a "Redcap" should charge a soldier who leaves a picture house with his bladder up to his umbilicus and urinates in the sandy desert. The victim may not know the whereabouts of the nearest urinal and, naturally, does not wish to wet his trousers!

The baiting and siting of fly traps are simple but require much supervision if fly traps are to function as such.

#### SANITARY EQUIPMENT AND IMPROVISATION.

It is unfortunate that general hospitals and, it is presumed, many non-medical units, do not arrive in this theatre of war with sanitary equipment available for immediate use; that is, pending the arrival of their A.F. G.1098 equipment and pending the completion

of deep trench latrines, Otway pits, soakage pits and incinerators. Picks, shovels and other tools have to be supplied by the R.E. and these are frequently in short supply. There is a limit to improvisation and an adequate supply of tools and materials is a necessity.

There was, in many cases, a long time lag between the arrival of a general hospital in Normandy and the completion of any R.E. services. This was not the fault of the R.E. who were at times short of tools and materials for the multiplicity of R.E. services they were due to complete.

It is essential that units be self-supporting in this early sanitation. In 74 (BR) General Hospital we packed picks and shovels in our unit transport which arrived at our hospital site one day before us. Beside muslin, we had purchased additional carpenters' tools in England and brought with us such items as nails, paint, numerous hospital and unit signs and even rat poison (barium carbonate).

Except for the loan of R.E. tools, the gift of a little hessian and cement, packing case wood from a R.S.D., waste oil, oil drums, pitch drums and scrap metal, mostly "scrounged," and some nails purchased locally, this hospital was completely self-supporting in sanitation for over two months. In my opinion, with available Pioneer Corps labour and some extra material such as corrugated iron, wood and nails, we could have been self-supporting for an indefinite period. This is not an idle boast but a considered opinion.

To sit back and wait with folded arms for R.E. help and materials shows a deplorable lack of initiative. On the other hand, too much should not be left to improvisation and "scrounging." The later a unit arrives in this particular area the harder it is to find materials with which to improvise in sanitation.

#### ACKNOWLEDGMENTS.

My thanks are due to some officers and to many other ranks of my unit and attached Pioneer Corps personnel for help in these experiments and for good work in sanitation. To Privates N. King and J. Marner for their excellent sketches and diagrams. To Lieutenant J. Solis and Serjeant G. Sorbie for their painstaking counts of flies. To Lieutenant R. B. Magee, Pioneer Corps, for his co-operation and help during our first strenuous weeks in Normandy. To Private G. Bodenham, Pioneer Corps, for his excellent work in concrete seals for Otway and other pits. To Private W. S. Cameron and other carpenters for their keenness and accurate work on fly traps and many other sanitary "products." Last, and by no means least, my thanks are due to our three R.A.M.C. other ranks employed wholly on sanitation, Corporal A. Gumbrell, Lance Corporal H. Gudger and L/A/U/Lance Corporal F. Marino, who have done much towards fly prevention in 74 (BR) General Hospital.

## EXPERIENCES AS AN OFFICER IN MEDICAL CHARGE OF BRITISH PRISONERS OF WAR IN ITALY AND GERMANY.

By Captain J. K. DRUCQUER,  
*Royal Army Medical Corps.*

[Received August 17, 1945]

I WAS wounded at El Alamein and taken prisoner on July 1, 1942, and, thereafter, worked successively at the following camps and hospitals:—

- (1) August and September, 1942—Caserta.
- (2) Bologna convalescent hospital where I was the first British medical officer to be employed.
- (3) October, 1942, to July, 1943—Senior Medical Officer, Padula camp.
- (4) Medical Officer Bologna camp.
- (5) September, 1943, to July, 1944—Senior Medical Officer in the Senior Officers' camp, Oflag XII B, Hadamar, Germany.
- (6) Senior Medical Officer—Officers' transit camp, Hadamar.
- (7) Volunteered after liberation to act as medical officer to "displaced persons"—Lollar, Germany—until arrival of A.M.G.O.T.

### ITALY.

At Caserta in August and September, 1942, there were two epidemics in surrounding camps—diphtheria and jaundice.

*Diphtheria.*—1 large ward of 120 beds was entirely given over to British P.O.W.s, who usually arrived very ill indeed. This was due to the fact that the Italians were always extremely tardy in administering serum—usually three or four days after well-marked membrane development. British M.O.s at the camp were not allowed to administer serum themselves. In many cases no serum had been given, and in those in which it had the dosage was often ludicrous—1,000 or 2,000 units. The result was that many patients arrived *in extremis* whilst the percentage of complications was very high—55 per cent. The ward was a clinical storehouse such as I hope never to see again. A number died of myocardial failure with dramatic suddenness, others of respiratory failure. No typing of bacilli was possible. The majority of the complications consisted of nerve paralysis of varying degree. Of the 50 per cent suffering from such paralyses over 60 per cent had palatal paralysis of greater or less intensity, the remaining 40 per cent being peripheral—mainly lower limb. Treatment was a continual struggle with the Italians—one could never persuade them to give a large enough dose of serum. With experience of cutaneous diphtheria both in the last war and in this, and with this unfortunate prison experience in which many lives were needlessly lost, it seems to me that there is a very strong argument for the compulsory inoculation of all troops with toxoid.

*Epidemic Jaundice.*—This was extremely rife in Southern Italy. The type met with in prison camps was invariably as follows: a sudden temperature up to 101, lasting two days, a latent period with gradual development of nausea and loss of appetite, on the fifth day appearance of dark urine and jaundice of sclera which then rapidly developed, reaching a maximum in four days, and hardly ever took longer than fourteen days to disappear. This mysterious disease fully lived up to its name. I never saw a case in an O.R. at Padula. The O.R.s lived in a separate hut in the middle of the compound. They were in contact all the time with the officers, lived in much more crowded conditions, and equally as communally as the officers as regards sharing of kitchen facilities, pots and pans, etc. The disease was ever present, but never reached explosive proportions. A spot map showed no possible relationship between cases—one would occur, then another in an entirely different part of the camp; then a pause of a week or two, and another sporadic case would appear. At the time of our removal into Germany there were 7 cases at varying stages in the camp



infirmary. These with 20 or 25 others were packed into a box car. None of the 25 developed jaundice. Most interesting was the fact that the disease ceased as if it had been cut with a knife immediately on crossing the German frontier. From the day of my arrival in Germany no further case of jaundice occurred, although I was with the same group of officers all the time. This suggests that it is a fly-borne disease as, epidemiologically, conditions were the same except for the fly factor. The dividing line between Italy and Germany was most striking. There were 67 cases at Padula, and 21 at Bologna. As regards treatment the Italians insisted on giving i.v. urotropine daily for five days. Clinically, one's impression was favourable in that nausea and vomiting seemed to be lessened. Administration of a fat-free diet unfortunately presented no difficulties.

*General Health in Padula and Bologna Camps.*—General health was very good. Supply of Red Cross parcels was regular. Fruit and vegetables were obtainable in abundance from the Italians. There was sunshine for nine months of the year. The incidence of disease was rather less than one would find in a group of 605 individuals under normal conditions. Cuts became very easily infected, desert sores tended to persist and impetigo was common and resistant to treatment—often silver nitrate was the only thing which would clear it up. There were 2 cases of paratyphoid (confirmed bacteriologically) and 2 of pneumonia, treated with sulphapyridine. It cannot be said that there was any marked under-nutrition. Two symptoms were universal: (1) A distension of the lower abdomen which usually came on after four to six weeks' captivity and persisted. (2) Frequency of micturition. Many unfortunates had to get up four or five times in the night. This I believe to be due to the low protein content of the diet, causing increased permeability in the kidneys. It is one of the first symptoms of an inadequate diet. A longitudinal stippling of the nails was also common, but dental caries did not appear to increase.

*Enteritis.*—A mild enteritis with diarrhoea was very common. I wrote to the Usher Institute in Edinburgh who kindly sent me a large supply of bacteriophage by air-mail. There has long been a controversy about this in the medical Press, mainly from Alexandria where bacteriophage is used as a routine by civilian doctors. I can only say that, in every case in Italy, the diarrhoea cleared up in twelve hours, i.e. after 6 two-hourly doses. Without it our difficulties would have been seriously increased. In camp in Italy it certainly did all that has been claimed for it. I may say that I had previously employed this substance in the desert with my own unit with excellent results.

*Surgery.*—There was no case of an acute surgical emergency. No case of acute appendicitis occurred. Perhaps this is an argument in support of those who maintain that appendicitis is essentially a disease of civilization and of modern rush and hurry. In our monastic life we were not troubled with the problems of surgery.

*Psychological.*—The psychological problem was characterized by its absence. We lived a quiet and detached life in a monastery high in the Calabrian hills. Much has been written and much is being done on the psychological aspect of the returned prisoner. I have myself read with impatience many well-meaning pamphlets. The problem has been over-emphasized. I think most people at home have been surprised at how normal in fact we were.

I had only two psychiatric problems whilst in Italy; none in Germany. Both were cases who would probably have broken down eventually in any event. Homosexuality was not a problem—it was considerably less for example than that which obtains in the Army in peacetime in India. A curious tendency to femininity, however, was often observed in the younger and more good-looking officers. In general it may be said that mentally we were just as normal, if not more stable, than a group of 600 at home.

No deaths occurred at either Padula or Bologna camps.

#### GERMANY.

In Germany I was M.O. at the senior officers' camp Oflag XII B, General Fortune commanding, from September, 1943, to July, 1944. The average age of the officers here was much older—say 38. Yet their general health was if anything better than it had been in Italy. We had no jaundice or enteritis, due to better sanitation. From a medical point of

view the story was quite unremarkable. There were 2 cases of sudden death, both from coronary thrombosis in 2 officers aged 45 and 46. One case of acute appendicitis and 1 of acute intestinal obstruction due to a band. We were mass radiographed in June, 1944—no case of tuberculosis detected. Injections of T.T. and T.A.B. were kept up, and we also had a supply of typhus vaccine from Canada.

One dramatic incident occurred. An officer had been operated on for a hernia, but had been very badly treated, in Limburg hospital. He arrived back in camp in a wheelbarrow, weighing 5 stones and on the point of death. He had multiple abscesses of groin and thigh. His return happened to coincide with the arrival of an air-mail packet of penicillin. We had hardly heard of this, much less seen it or used it. Yet we pumped it in quite empirically and the patient made a startling recovery.

We had in this camp a very well-equipped surgery and dental surgery. The German doctor was always helpful and co-operative and supplied us with what he could. There was no outbreak of any disease in epidemic form, but there was one interesting epidemiological experience. We had been entirely free from colds up till February, 1944, in spite of a severe winter. In February a draft of 20 officers arrived who had been prisoners in Germany for four years. Within a week half the camp was down with a cold, and colds were ever present after that.

There was an almost continual supply of Red Cross parcels up to November, 1944, so that the question of under-nutrition was not a serious one. We were without parcels during December, January, and February, and were beginning to feel the effects. In general it could not be said that the food situation was ever serious; in this we were lucky as regards parcels.

From July, 1944, to March, 1945, I was M.O. in charge of the officers' transit camp, Hadamar. Through this camp passed every officer (British and Canadian) captured since D-Day, including all the officer prisoners of the 1st Airborne Division at Arnhem. During this time I received no supplies whatever from Geneva, and had to rely on the meagre German ration. All these officers were young and fit, and my task was an easy one. Their health was and remained good whilst in the transit camp, which was eventually destroyed by Allied bombing.

After liberation I found myself in sole medical charge of a small German town (Lollar, near Giessen), and about 7,000 displaced persons, the German doctors having fled. I could do nothing except try to organize some order out of chaos and segregate the dead and dying from the comparatively healthy. One of the greatest problems was a large batch of Ukrainian women who were semi-collaborators. Almost my very first act as a free man was to deliver a Ukrainian woman of a baby boy.

After nearly three years a prisoner, I was not sorry when A.M.G.O.T. arrived. Looking back, I think it fair to say that the health of the officers of whom I had medical charge did not suffer materially. This was due mainly to the Red Cross, but was also partly due to the fact that the treatment of officer prisoners in both Italy and Germany was, on the whole, good. The good health in Italy was in large measure due to the work of our own medical officers, since Italian military medicine can only be described as out of date. Italian medicine appeared to be like other aspects of the Fascist regime—a shop front. There were attractive drugs in attractive packings, all to be given by injection, but mostly therapeutically useless. Amputation was often ruthlessly carried out without anaesthesia. They were afraid of morphia. I remember one man dying of tetanus whom the Italian doctor refused morphia for fear of inducing a habit!

In spite of the fact that, before the war, there was medical reciprocity between Italy and Great Britain, their attitude towards British medical officers was often unprofessional and they regarded us as third-year medical students. By contrast, German medicine, in spite of the prostitution to which it had been put in concentration camps, was, in its fundamental methods, more akin to our own. German doctors at least accepted us and let us get on with the job.

I have tried to present a general survey of the health of the camps I was in, camps admittedly fortunately situated. I hope it may be of use in forming a picture of the medical situation in our P.O.W. camps in Italy and Germany.

## NOTES ON AIR EVACUATION

By Lieutenant-Colonel D. M. BAKER, Captain R. S. McCLELLAND, and  
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THE following notes on the problem of air evacuation as it affects Field Ambulances on active service have been compiled from experience gained in the Arakan, Spring, 1944, Tamu-Imphal Areas, 1944-1945 and in a Divisional advance from Kalewa to Shwebo. It is realized that most of the suggestions contained in this report are probably well known to all who read it, but as there appears to be little available information on the subject, it is hoped that some practical suggestions may obviate the same mistakes being made in future by Field Ambulances taking over Air Evacuation for the first time.

## A. Aircraft Used.

## LIGHT AIRCRAFT.

(1) *L5 Flying Jeep or Stinson (American)*.—This is a single-seater high-wing monoplane with a low landing speed requiring a strip of 350 yards for safe take-off. Many of these are now being fitted with apparatus to carry either a lying or a sitting case. It is hoped that this will become universal. Loading presents no difficulty.

In the latest pattern, the standard stretcher is loaded in the rear cockpit by opening the large panel in the right hand wall of the fuselage. The patient is normally carried head foremost but, if his leg is in a Thomas splint, he must be loaded head tailwards and the end of the Thomas splint threaded into the fuselage first. In other types, the patient must be slid into the rear cockpit off the stretcher through an aperture in the roof. This plane has efficient landing brakes and is very safe. Economic range is under 100 miles.

(2) *Tiger Moth—Two-seater Biplane*.—For flying cases the rear cockpit is converted into a coffin-like compartment with hingeback lid. Landing space is as for L5. The patient is loaded in the Neil Robertson stretcher provided in the aircraft. The patient is utterly cut off and cannot see out and plenty of reassurance is required. This plane has no landing brakes, which is a danger in high wind. Converted planes are always flown from the forward cockpit. When the rear cockpit is empty the weight is far forward and there is a tendency for it to tip forward on uneven ground.

(3) *Fox Moth*.—This plane did invaluable service in evacuation from the Southern Arakan and from the Africans in the Kaladan. It is a single-engine biplane flown from the rear cockpit, forward and below which there is a four-seater cabin—the passengers sitting as in a Victoria. Capacity—four sitting, or one lying with attendant.

A special stretcher is provided. This is a steel frame shaped to the body covered in canvas. In loading, one man lies on the lower wing opposite the door on the left of the plane, and hands the patient from the stretcher squad to the arms of the pilot inserted through the opposite window.

It has good landing brakes. Take-off and landing distance is rather shorter than for the L5.

## MEDIUM PLANES.

(1) *Anson British*.—A low-wing two-engined monoplane, which requires 800 yards for take-off.

The capacity is four sitting or one lying and three sitting. A lying case must be on Neil Robertson stretcher owing to the narrowness of the door. This is an unsatisfactory plane for this work.

(2) *C64. Norseman. American.*—This is a high-winged single engine monoplane with a remarkable capacity. It requires 750 yards for take-off.

The capacity is three stretchers loaded on the right-hand side of the cockpit in tiers on slings plus 2 sitting ; or 5 sitting.

There is a *wide door* and there are no special loading difficulties.

(3) *Gliders.*—Their capacity is four lying patients. They can be used on small strips provided there are no trees to hinder the snatch by the tug plane.

#### HEAVY PLANES.

(1) *C47 Dakota.*—This is a two-engined low-winged monoplane—American. The capacity is 18 stretcher cases in three tiers—9 on each side plus 5 sitting ; or 28 sitting plus kit.

*Loading.*—From before backwards and from above downwards. Squads—4 in plane forward. Two at door of plane to take cases forward and assist with brace attachments, 4 on the ground off loading ambulance cars into plane, 4 loading ambulance cars at air transit centre.

Time : Fifteen minutes.

(2) *C36 Commando.*—American. This is a larger type of the Dakota. 24 stretcher cases in four tiers. Twelve on each side plus 10 sitting ; or 40 sitting, plus kit.

Door 8 feet from ground. The same squads are required but the height makes loading on to the plane more difficult, but easier to manœuvre once inside plane. Time : Twenty minutes.

When at rest the fuselage on both of these planes is on a considerable slope and the aluminium decking is slippery. All loading squads in the plane should wear rubber-soled shoes.

#### B. Airfields.

*Marking.*—A white cloth "L" at each corner. Dimensions 6 feet by 1 foot. White strips 6 feet by 1 foot at 50 yards intervals marking lateral boundaries of strip.

A "T" is placed on the left of the strip half way up the long arm pointing towards the approaching aircraft. That is, the aircraft lands up the "T." The "T" is usually placed in this country with regard to tree clearance rather than wind. Minimum lengths required : Light planes, 400 by 30 yards. Medium planes, 600 by 40 yards. Heavy planes, 1,500 by 50 yards.

In flat country an airstrip can be rapidly made by the Field Ambulance personnel by removing bunds, though this will require grading later when Engineers become available. Test for bumps with a 15 cwt. truck driven fast.

It should be the principle that wherever there is any likelihood of a forward light strip being subsequently used for C64s. the earliest action should be made to lengthen it so that the forward air transit centre can be rapidly moved forward to it.

#### C. Types of Cases.

*PRIORITIES.*—(i) Abdomens ; (ii) Chests ; (iii) Head, maxillo-facial injuries and compound fractured femurs ; (iv) Severe burns.

There would appear to be very few contra-indications for air evacuation except : (1) Typhus cases should NEVER be flown out during the acute stage. (2) Penetrating chest wounds should *not* be flown out if the aircraft is going to have to fly high. Cases in severe shock are also badly affected by height.

When gliders are being used the snatch is a considerable ordeal and the flight tends to be very rough and at a considerable height. This should be borne in mind.

#### D. Tactical Layout.

In our opinion the tactical layout should be as follows :—

(a) *Divisional Zone.*—A forward light airstrip, situated alongside each forward M.D.S.

Evacuation by light plane to forward air transit centre usually and economically not more than thirty miles back.

(b) *Divisional Corps Zone*.—The latter centre should be the base for the light aircraft and either the original strip must be enlarged to 750 yards to take Norsemen, or a separate strip of this length must be provided.

Either the Corps Field Ambulance or, in emergencies, the rearward Divisional Field Ambulance should provide M.D.S. (with surgical team attached) and air transit organization. Evacuation thence to C.C.S. or Corps Medical Centre by C64.

In our opinion, certain light aircraft, say four, should be under the control of A.D.M.S. of each Division. The remaining aircraft would be held in reserve under Corps control to be switched to airstrip requiring mass evacuation. The four aircraft should be based on the airstrip near the rearmost Divisional M.D.S. An argument against this has been that maintenance would be impossible. Daily maintenance should, however, be possible and planes can be exchanged with light plane base when heavier maintenance is required. Moreover the administrative arrangements for the supply of rations, P.O.L., etc., to light aircraft detachment can be the same as for the Artillery A.O.P. squadron with whom they would normally be accommodated. The enormous advantages of such an arrangement are as follows: (a) Smooth and rapid evacuation of casualties from forward areas to surgeon with minimum delay. That is to say, from A.D.S. to M.D.S. (b) Planes rapidly available at any time, either to evacuate cases or to take surgeon forward, and it enables the surgeon to decide immediately and without hesitation on the best disposal of his case. (c) Enables A.D.M.S. Division to hold more cases forward than might otherwise be evacuated direct from most forward strip to the C.C.S. This applies especially to the Divisional sick. (d) It saves petrol and time in that aircraft are further forward each morning to start their day's work. (e) It allows of the O.C. Squadron being in possession of early and accurate information of forward airstrips and likely casualties.

At times, if a large strip has been captured near the forward air transit centre, large planes, Dakotas and Commandos, C47 and C36, may land at this level. In this case direct sorting of cases for evacuation to C.C.S. and to a General Hospital must be done.

(It is pointed out here that unlike light and medium planes which are used for casualty evacuation only, the large planes are only available for casualty evacuation on the return-run from delivering supplies. There is, therefore, never a chance of asking for such planes. The casualties must simply be ready for evacuation at the planes' convenience.)

(c) *Corps to Army Zone*.—At C.C.S. level, i.e. rearward air transit centre, there should be a C64 strip for the reception of patients and a C47 strip for onward evacuation of casualties to General Hospital at base.

The C64 strip (at rearward air transit centre) should be the base for medium planes. If, however, this involves duplication of ground maintenance organization, these planes can well be based on the forward air transit strip with the light plane base. If it were not for the acute shortage of Dakotas in this theatre, the ideal would be for one or two large planes to be placed at the disposal of the Medical Services to run purely as air ambulances, as was done by the Americans in North Burma.

(d) *Army Zone*.—Base for large aircraft. General Hospitals situated in the vicinity with centres for treatment of special cases, e.g. maxillo-facial, burns—not normally provided at Corps Medical Centre.

## E. Light Aircraft Control.

At present a plane from light plane base lands at each forward strip early every morning and receives from the medical officer in charge a WRITTEN message giving the number of (a) sitting and (b) lying cases awaiting evacuation. No priority is given and this has at times caused an anomalous situation, particularly when two Divisions are based on the same forward air transit centre. The early morning indent from the first Division may be for "two lying and two sitting" planes. Both the lying cases happen to be "acute surgical" but no message

to this effect is sent. The other Division indents for "ten lying" (all of which are post-operative convalescents and of no great urgency) and "twelve sitting." Confronted with these figures, the O.C. Light Air Squadron will very naturally allot the second Division the higher priority since they have the larger number for evacuation and, in consequence, as has been known to occur, the urgent cases from the first division may not be evacuated till the next day.

To overcome this we suggest the following simple code :—

- A. Urgent lying cases.
- B. Lying cases for evacuation, but no great urgency.
- C. Sitting cases.

Specimen messages would read :—

From one div. : "APRICOT AIRSTRIP. A2 B10 C30"

From other div. : "PLUM AIRSTRIP. B30 C75"

Under this system the O.C. Light plane squadron would despatch his first two available planes to the correct airstrip.

Were the suggestion made in para. D, sub-para. (b) (i.e. placing certain aircraft under the control of each A.D.M.S.) adopted, intercommunication would be even further simplified.

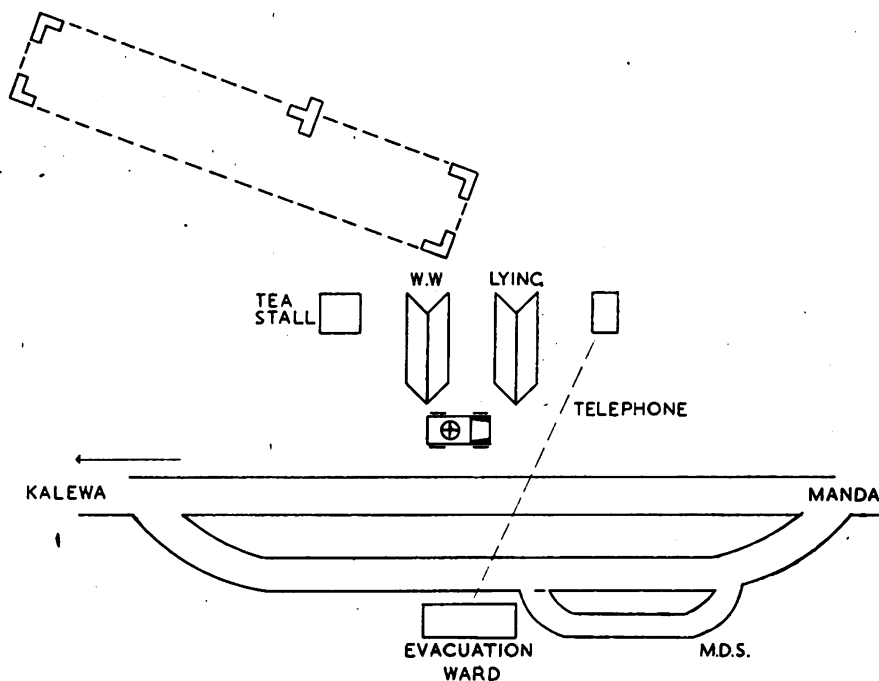


DIAGRAM 1.

#### F. Layout of Medical Installations for Airstrips (see Appendix).

Diagram 1. Forward Light Strip—Division, see THETKEGYN.

Diagram 2. Forward Air Transit Strip (s)—Div.—Corps (and notes on organization) (as at YE-U).

Diagram 3. Rearward Air Transit Strip—Corps to Army (as at INBAUNG).

Diagram 4. Combined Forward and Rear Air Transit Strip (as at TAMU).

The diagrams are self-explanatory. A number of cardinal rules must, however, be observed for smooth running.

(1) *Wards on Airstrip*.—These must be adequate to ensure that an aircraft **MUST NEVER** WAIT for the patient. They must be situated as near the airstrip as possible at the end at which the aircraft finishes its run in, under cover to give shade and camouflage.

(2) *The Treatment Room*.—Must be adequate to deal with routine treatment of patients awaiting evacuation and capable of dealing with emergencies in serious patients.

(3) *A Tea and Bun Stall* must be constantly running alongside.

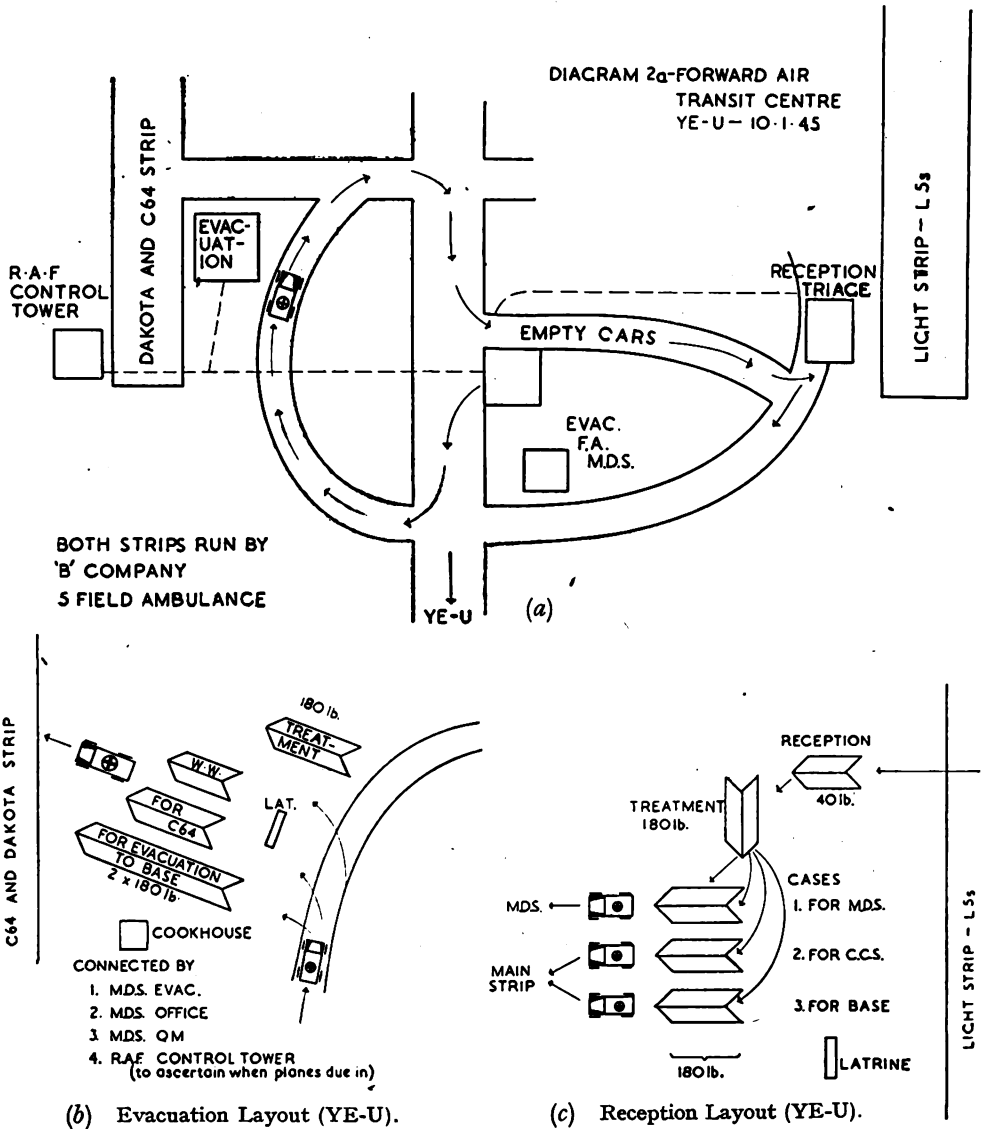


DIAGRAM 2.

(4) *The Treatment Room* must be in telephonic communication with the office of the M.D.S., C.C.S. or General Hospital, and the airstrip must be as near to the medical unit as is possible.

(5) Sufficient cases must be held on the airstrip to meet the capacity of the maximum number of expected planes. It should *never* be necessary to rush a case at the last moment from the parent medical unit.

(6) Apart from medical personnel to run the airstrip wards, treatment room and tea and bun stall, the provision of loading orderlies must be adequate to enable the maximum possible aircraft, likely to land at any one time, to be loaded simultaneously.

Loading of each type of aircraft must be a drill and the teams must know their jobs inside out.

(7) There must be a separate organization for each airstrip each in telephonic communication with the parent medical unit and R.A.F. control. Where all types of plane are

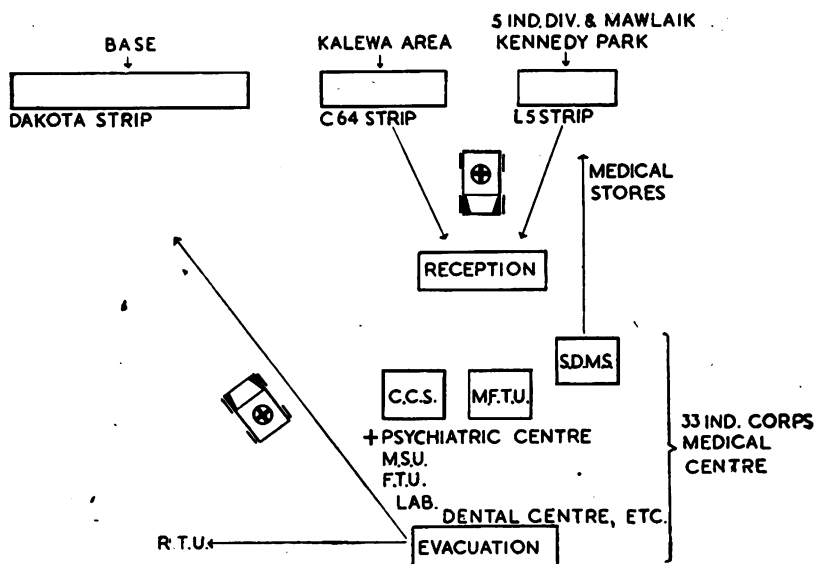


DIAGRAM 3.

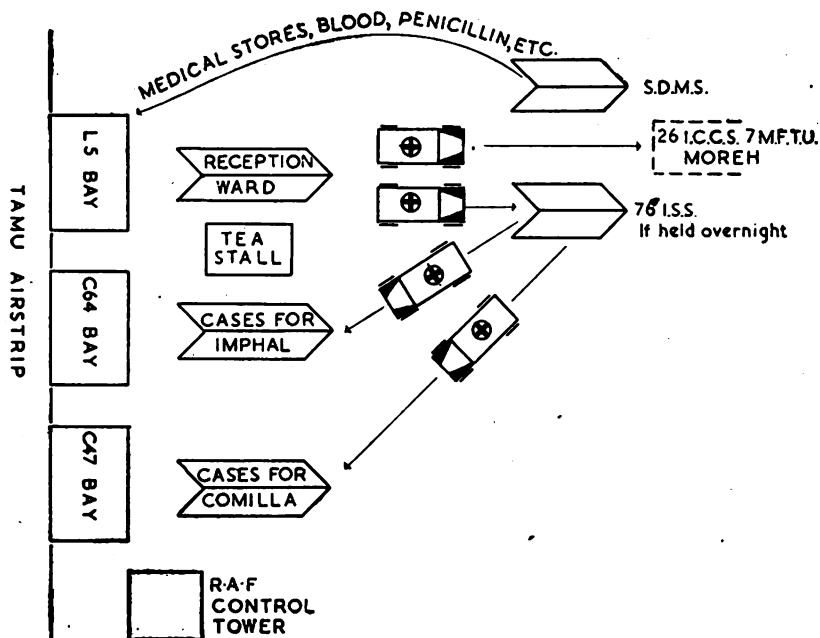


DIAGRAM 4.



landing on the same strip, separate and clearly marked wards must be provided for each disposal category and a ward into which incoming cases are taken to be sorted. Ambulance cars for delivery of patients to parent medical unit or to another strip must wait in bays clearly marked with destination, e.g. M.D.S., C.C.S., other strip, etc.

(8) *Reassurance and the Psychological Effect*.—A patient is often undergoing his first flight. The importance of reassurance cannot be over-emphasized. The psychological effect of a smooth air evacuation system is enormous both to patients and to forward troops who feel they have it behind them.

(9) Full surgical facilities at the Forward Air Transit Medical Unit are essential.

#### **G. Infectious Cases—Special Instructions on Cleaning the Aircraft are Issued.**

#### **H. Medical Orderlies.**

Medical orderlies for planes may occasionally have to be provided by a Field Ambulance. Most of the cases will be on sulphonamide and may be dehydrated. The orderly should encourage patients to drink throughout the journey and by constant attention to each patient will be able to anticipate his desire for fluid, bed-pan or urinal and give reassurance and dressing adjustment where necessary.

#### **I. Documentation.**

In small strips little documentation is necessary. At the larger strips, where evacuation is solely to Base, suitable documentation is as follows:

A nominal roll of patients, in plane loads, is made out in triplicate; one copy being sent to the C.C.S. evacuating the patients; one copy with the patients to be handed in at the Base Staging Section; and one copy retained. An abstract is made out at the foot of the nominal roll showing number of lying cases, number of walking and whether wounded, injured or sick. Similar details to those on the abstract are entered in the Pilot's Manifest.

H.Q. Strip also requires an abstract of patients evacuated, this being the entire number evacuated during the day tabulated as follows:

Officers, V.C.O.s, B.O.R.s, I.O.R.s, Civilians and P.O.W.s.

#### **J. Supplies.**

The importance of forward going aircraft never travelling empty cannot be too heavily emphasized. A dump must be provided for the supply of blankets, stretchers, medical stores, etc., on the strips. At present, the back-wastage of stretchers and blankets is a very serious drain.

#### *Dealing with this Problem by Zones.*

(1) There must be such a dump at the forward air transit centre, i.e. light plane base. This will probably be replenished by normal supply methods or by Dakota from base.

(2) There must be a larger dump, e.g. sub-depot medical stores, at rear air transit centre, i.e. C64 base, to ensure that medium aircraft carry full load forward. This must be supervised by the O.C. Medical Unit which is running the medical organization on the strip. This again will be supplied through the normal supply route or by Dakota from base.

(3) Rearward of this, the problem becomes entirely different. The large planes are not primarily casualty planes and travel forward fully laden. The only air supply of medical stores from base, therefore, is that allowed as a proportion of the total air lift and must be indented for by the *forward formation* on the A.S.D. at base.

Were the suggestion in para. "D," sub-para. (c) adopted, i.e. the provision of a few heavy planes simply and solely for air evacuation, the problem of forwarding medical supplies would be simple. They could also be used for returning discharged fit to units.

We wish to thank Colonel W. J. Officer, A.D.M.S., for his encouragement, for his many helpful suggestions and for permission to forward this paper. Ideas and suggestions have

been submitted by many members of the Field Ambulance and to them, too, our thanks are due.

#### APPENDIX.

I. As will be seen from the diagrams 1-4, with the varying types and layouts of airstrips, it is impossible to form hard and fast rules about air evacuation of casualties, but the following principles have all been employed and found extremely practical.

II. At Thetkegyn (Diagram 1) the airstrip was just across the main road from the M.D.S. and was concerned only with evacuation, reception being entirely by M.T. An evacuation ward, consisting of 2 x 180 lb. tents, was incorporated in the M.D.S. layout, near the track leading out. All the cardinal rules laid down under para. "E" were in operation. Cases from the ward were moved each morning to the shelter of two 180 lb. "flies"—one for stretcher cases and one for walking wounded. As cases were evacuated "replacements" for the airstrip wards were sent from the evacuation ward on telephonic request. In this way planes never had to wait and evacuation went very smoothly. Personnel required were 1 officer, with batman runner, 1 treatment orderly, 1 cook, 4 S.B.s on the airstrip; 1 M.O., 1 clerk, 3 day staff, 3 night staff, 4 S.B.s and 1 cook in the evacuation ward—a total of 21.

III. At YE-U (Diagram 2) there was quite a distance between L5 and Dakota airstrips, so the layout depicted was employed. Reception of casualties was done on the L5 airstrip and divided into "casualties for admission to M.D.S." and "Cases for evacuation to hospital." These were housed in 180 lb. "flies" pending arrival of vehicles to take them to their respective departments. A chev. amb., a jeep amb. and a 15 cwt. Dodge truck were used and the service was excellent, as no patient was more than twenty minutes in reception block. Personnel employed here were 1 M.O., 1 staff sergeant in charge of loading, 1 clerk, 2 treatment orderlies, 2 ward orderlies and 4 S.B.s—2 between airstrip and reception, 2 unloading vehicles.

NOTE.—More S.B.s would have been an advantage, but with the limited personnel available due to the large number required for loading Dakotas and Commandos, 4 were just capable of doing the job, since the L5s came in right beside the reception tent. Tea was supplied on request from the M.D.S. cookhouse which was adjacent.

In the evacuation block on the Dakota airstrip two wards were erected consisting of two 180 lb. tents for "cases for evacuation to base hospital" and one 180 lb. tent was erected as "waiting room" for W.W. The wards were capable of holding and treating patients overnight, walking wounded being returned to the M.D.S. for the night if evacuation had stopped for the day. One ambulance and one 15 cwt. truck were employed here to ferry cases from the wards to the planes and were quite adequate to deal with the cases without any holdups.

As the distribution of personnel here was important it will be dealt with rather fully. On arrival at the evacuation strip the patients are "Booked in" by a clerk, the Officer i/c checks up on treatment ordered, and sees that this is carried out by the ward orderlies. Ward orderlies are 7 in number—1 in C.C.S. ward day and night, 2 in base hospital ward day and night, and 1 in W.W. by day. At least 14 S.B.s are required, allotted tasks as follows (with 14 only one plane can be loaded at a time):

One squad of 4 at evacuation wards to unload incoming ambulances and load vehicles leaving the ward with cases to emplane.

One squad of four at the plane to unload ambulances and hand stretcher cases into the third squad.

One squad of two—just inside the plane.

One squad of four, wearing gym. shoes, working in the plane (if a Dakota or Commando) taking cases over from squad 3 and immobilizing the stretchers.

With this number of stretcher bearers it was possible to load Dakotas in fifteen minutes and Commandos in twenty.

Other personnel employed in the evacuation block were: 1 N.C.O. who supervised rations and performed company duties, 2 cooks, 1 sanitary orderly, 1 batman runner, and 2 drivers—a total of 28.

NOTE.—Unfortunately there was no evacuation to C.C.S. from this strip, so the C.C.S. ward was not employed, but had such evacuation been in operation a further cover would have been required on the reception strip, clearly marked "Evacuation cases for C.C.S." A much larger ward is required for "Evacuation cases for base hospital" than for C.C.S., as many more must be held there to prevent the greater capacity planes having to wait.

\*IV. At Tamu, one strip was used for all planes and the layout there (Diagram 4) is as near perfect as could be desired, when such a state of affairs exists. It does, however, need very efficient control from the R.A.F. control tower to handle so many aircraft of different types and speeds on one strip and a certain amount of enforced delay in landing must often be accepted.



## NOTES ON A "MULE BORNE" A.D.S.

By Major H. G. SKINNER,  
*Royal Army Medical Corps.*

[Received August 1, 1945.]

DURING the autumn of 1944, a company of a Field Ambulance, in a Division operating in the Apennines, North of Florence, was ordered to move in support of an attacking Infantry Brigade and open an A.D.S. on a site which could be approached only on foot or by mule over a mountain track. At this time the only track available to jeeps had not been cleared of the enemy. The move was made at four hours' notice and, although a warning had been given forty-eight hours previously that such a move was probable, there was no opportunity to practise loading the mules before the operation started.

Prior to the move it had not been possible to reconnoitre the proposed site as it was under enemy control. It was known that there were several small farmhouses in the area, one of which had been allotted (on the map) to the Field Ambulance. The only area in which it was possible to site the A.D.S. was so vulnerable to enemy attack that it was decided that as few men as possible should staff the Dressing Station. At the time orders for the move were issued, the Commanding Officer stated that it might be necessary to hold casualties for any period up to forty-eight hours until the track mentioned was found to be clear for jeeps and ambulance cars. This factor influenced the number of rations carried by the mules.

After moving during the night with the mules over about 5,000 yards of mountain track, the A.D.S. was established at 05.00 hours—in fact before the R.A.P. of the second attacking Battalion. Ambulance cars were able to reach the A.D.S. by 14.00 hours on the same day, using a different route, and thirty-five lying casualties were evacuated.

The total personnel who formed the A.D.S. were—2 medical officers, 1 staff serjeant, 2 cooks, 1 clerk, 14 stretcher bearers (including 2 N.C.O.s).

Certain factors influenced the decision as to the quantity and nature of stores.

(a) It was intended to site the A.D.S. in a building, therefore tentage was not necessary. One tent, however, was carried for use in an emergency. It was not used.

(b) As it was expected that patients might have to be held for forty-eight hours extra rations were carried.

(c) If the action were successful, it was hoped to reach the A.D.S. by jeep or ambulance car within forty-eight hours, so that further supplies and equipment could be sent by road. In fact, ambulance cars reached the A.D.S. nine hours after it opened.

The following comments are made on the actual loading of the mules:—

(a) The scale of equipment was designed for mules capable of carrying up to 200 lb. each. Mules vary mule to mule and close liaison should be maintained with the officer in charge of the mules, so that the best possible distribution of the loads may be made.

(b) It is suggested that strip metal cages with rings attached might be made for water and kerosene containers. Roping is difficult and, unless the "universal carrier" is available, almost impossible.

(c) If sufficient notice is given and the mules are available, the loading should be done with an adequate light. Roping in the dark is unsatisfactory as, even if items of equipment are not lost, the ropes tend to be put on "out of the true" and consequently slacken after the mule has travelled a few hundred yards.

(d) The carrying of closed stretchers on pack mules was deprecated by the officer in charge of the mules. His reason was that if the stretchers were carried close to the mule's body, it

could not swing its head—a serious drawback to its hill climbing ability. If, on the other hand, stretchers are strapped on the outside of bulky loads, and the mule falls, then the stretchers are very liable to be broken.

In conclusion a few "Do's" and "DON'T's," as advocated by various mule officers, may be passed on :—

DO make sure that the loads are as nearly as possible equally balanced.

DO check all loads at short halts.

DON'T load mules until about ten minutes before the start.

DON'T keep mules standing about loaded at other than short halts.

Unload, and reload as late as possible before moving on.

I wish to express my thanks to the A.D.M.S., Colonel J. C. Gilroy, *O.B.E.*, and my Commanding Officer, Lieutenant-Colonel F. A. Bevan, *T.D.*, for permission to forward these notes and for assistance in preparing them.

[NOTE.—The editor regrets that tables of equipment and loading have been omitted owing to pressure on space.]

## MULE TRANSPORT BY FORWARD SURGICAL UNITS.

By Major T. LEVITT,  
*Royal Army Medical Corps,*  
*Of a Mobile Surgical Unit.*

[Received May 22, 1945]

THE transport of medical supplies and material by mules at night along intricate tracks through forward mined areas has recently demonstrated difficulties which have to be overcome by the responsible medical personnel.

There is the ever-present possibility of loss of valuable instruments by mules straying in the dark, or packs being thrown on to the adjoining mine-fields by distraught mules.

The following recommendations are made, with all due humility, to assist forward medical units in training their transport personnel.

As the call for mule transport is often unexpected, the procedure is performed an improvisation based on materials actually carried by the unit or available locally.

### METHOD OF PACKING.

If Indian Yak Dans are not obtainable, 4.5 ammunition boxes or P.I.A.T. mortar boxes are eminently suitable. Each ammunition box with contents weighs 40 lb. Two boxes on each side of the mule provide the required weight of 80 lb. for the side-load.

Care in packing is essential so as to prevent undue movement and breakage of important apparatus. Each box is so packed as to hold sufficient material for at least twenty operations. Lists of contents are made in triplicate, one copy being attached to the inside of each box. This prevents any undue difficulty in initiating a surgical operation under adverse circumstances. Each box is marked plainly with its number and weight to facilitate loading and repacking (*see Appendix*). Phosphorescent paint, if available, is invaluable for marking boxes used during night operations.

The Standard C.C.S. Operating Table, without its steel box, weighs approximately 72 lb. and can be carried either as a top-load or part of a side-load. As a top-load it has been found necessary to take great precautions to secure it absolutely firmly to the pack saddle by ensuring that the two pack saddle-straps and surcingle are applied tightly. It is at the best of times an unwieldy apparatus to transport and one can usually dispense with it. A stretcher supported by ammunition boxes often suffices. Four paratroop stretchers, folded, make a comfortable 76 lb. load.

*Blankets* are carried, 16 each, as a side-load. We have found the large sail-cloth kitbags (Navy type) suitable as containers for blankets.

The *Sterilizing Set*, packed in a larger box, is best carried as a top-load of 120 lb. It consists of a fish kettle sterilizer, bowl sterilizer, copper boiler with stand and an instrument table. Two primus stoves can easily be added to the load.

*Plasma* in a box containing 14 bottles with 7 giving-sets weighs 78 lb. and can be carried as a side-load.

*Tentage* for the operating theatre, required when no house is available, is transported in the usual fashion.

#### APPARATUS CARRIED BY THE THEATRE STAFF.

Each of the theatre staff carries hold-alls containing instruments, rubber tubing and surgical needles, so divided that an operation can be performed with the instruments carried by one person.

The anaesthetist has charge of the mask, stethoscope, airways, tourniquet and Ryle's tube.

A Higginson's syringe, in addition to its usual functions, takes the place, when used in a reverse direction, of a suction apparatus. Intestinal and chest suction measures need not be specially carried as they are best adapted from used plasma bottles and tubing.

In addition each person has 50 grammes of sterile sulphanilamide in 5-gramme packets.

*Loads must be Balanced.*—This is a most important factor. Correct previous weight measurements, duly tabulated, are essential.

*Ropes Must be Well and Truly Tied.*—Tying of ropes and loading has, perforce, to be done by the relatively untrained medical team and *not* by the muleteers. It is best accomplished by using two men on each side of the mule. Loads must be placed on to all four hooks simultaneously. If three men only are available, the odd one takes the weight of the opposite loaded side, whilst the new weight is being added. While tying the surcingle, it is essential to depress the load opposite the side of the buckle in order to maintain the balance.

*Night Transport.*—Sad experience has taught that, for traversing mined fields in the dark along taped paths, the most effective method for medical personnel, is to grasp the tail of the preceding mule. A comfortably loaded mule kicks but seldom and then only sideways.

*Fallen Mules*, injured or not, must always be unloaded. If the mule is injured the load is best dispersed among two other mules as top-loads, if no spare mule is available. The moral is obvious—retain a spare mule if possible. Medical orderlies have been injured by trying to unbuckle straps between the legs of fallen mules. To readjust straps, fallen mules must always be approached from over the flank.

*A reliable guide* is essential. An extra guide, left at a cross-road in the dark, has more than once prevented the second half of the train ending in a mine-field.

*Steep declines* tax medical orderlies most as personnel are expected by the muleteers to assist in settling the loads by holding on to the pack straps or ropes. It is common practice for members of the team to crowd up into a clump, especially when halted. This tendency must be prevented at all costs.

*A load check* must be carried out ten to fifteen minutes after departure and at every halt under cover.

Beginners fail to appreciate the necessity of laden mules having to swing out well beyond stationary objects or vehicles.

*Complete and willing co-operation* between medical orderlies and muleteers is essential and will be facilitated by the medical orderlies' development of a "mule consciousness." This is best obtained by previous practice in packing and tying up boxes, and by loading and unloading mules, under both day and night conditions.

#### CONCLUSION.

By packing the boxes in the manner outlined in the Appendix, the fact emerges that if only one mule of the whole train were to survive, provided he were not carrying boxes of plasma, sterilizing apparatus or the blankets, the operating team can still have the means of operating on at least 40 battle casualties.

## APPENDIX.

The ammunition box measures 24 in. by 14 in. by 10 in. and when

{	(i) <i>unpacked</i> weighs 22 lb.
	(ii) <i>packed</i> weighs 40 lb.

It contains

{	(1) Constant contents	{	(1) Additional material	= (A)
	(2) Variable contents		(2) " 2 drums "	= (C)

(B) and (C) are interchangeable, being equal in both weight and volume.

The box therefore holds either (A) + (B) or (A) + (C).

$$\text{Operating Unit} \left\{ \begin{array}{cc} \frac{(A) + (B)}{(A) + (C)} & \frac{(A) + (B)}{(A) + (C)} \begin{array}{l} 40 \text{ lb.} \\ 40 \text{ lb.} \end{array} \end{array} \right\} 80 \text{ lb.}$$

The side-load of two boxes, weighing a total of 80 lb., forms one complete operating unit. Each operating unit is capable of dealing with 20 battle casualties. A mule therefore carries the means for dealing with 40 such cases.

*Constant Contents.*

(A) Chloroform .. ..	1 lb.	1	Gloves, size 6½, 7, 7½, of each	pairs	2
Ether .. ..	1 lb.	1	Sodii chlor. .. ..	tabs.	30
Ethyl chloride .. ..	spray	1	Sulphanilamide .. ..	tabs.	50
Pentothal .. ..	grammes	20	Penicillin powder .. ..	grammes	25
Morphine "hyd." .. ..	amps.	6	" solution .. ..	amps.	2
Adrenaline .. ..	bot.	1	Biniodide .. ..	tabs.	30
Coramine .. ..	amps.	6	Acriflavine .. ..	tabs.	30
Nikethamide .. ..	amps.	6	A.G.G.S. .. ..	bot.	1
Gauze .. ..	rolls	12	T.A.B. .. ..	bot.	1
Gauze type "B" .. ..	tin	1	T.A.T. .. ..	bot.	1
Vaseline gauze .. ..	tin	1	Catgut Nos. 3, 1, 0 of each	tubes	12
Cotton-wool .. ..	lbs.	12	Silkworm gut .. ..	strands	12
W.O.W. bandages .. ..	6 in.	12	Towels unsterile .. ..		3
" .. ..	4 in.	12	Gowns unsterile .. ..		3
Triangular bandages .. ..		4	Caps and masks .. ..		3
Flannel bandages .. ..	4 in.	6	Kidney dish .. ..		1
Elastoplast .. ..	3 in.	1	Soap .. ..	tab.	1
Elastoplast ext. .. ..	3 in.	1	Cellon plaster, rolls 6 in. and 4 in., of each		6
Rubber sheet .. ..	yd.	1			

*Variable Contents: Additional Material.*

(B) Cellona plaster, 6 in and 4 in., of each	6	Iodine .. .. .	bot.	1
Syringe 5 c.c. or 10 c.c. ..	1	or,		
Many-tail bandages ..	4	2 Drums—		
Adhesive plaster .. .. 3 in.	1	(C) Two packed drums 12 in. by 10 in. and 5 in. by		
Nail brush .. ..	1	10 in.		



## A MOBILE DRESSING POST.

By Captain B. LEVY,  
Royal Army Medical Corps.

[Received August 27, 1945]

*Introductory.*—The idea of a mobile Operation Theatre is not new. There are many descriptions of the employment of converted vehicles for this purpose particularly in the Middle East. I was in a Field Ambulance attached to a Tank Brigade where we had a modified form of Operation Theatre constructed with a view to its employment in the rapidly moving warfare we associated with such a formation.

*Construction.*—A 2 by 4, 3-ton Chevrolet was used. We would have preferred a 4 by 4 vehicle but all those at our disposal had the wooden casing of the wheels projecting above the floor which took up valuable space. The canvas superstructure was removed and replaced entirely by wood. There were double doors behind and folding steps, the latter being taken from an old ambulance car. The structure was covered on the outside with canvas which had side extensions to make two pent houses, one on either side of the vehicle. The inside of the vehicle was lined with white oil-cloth. The water supply consisted of an extra petrol tank which was attached to the side of the vehicle. This was connected to an A.C. petrol pump and so to a wash-hand basin.

The lighting consisted of the searchlight of an armoured carrier with its bracket. This bracket had a ball and socket joint which allowed the lamp to be moved in any direction. There was also a fan. The power was obtained from two 6-volt batteries but in an emergency the battery of the vehicle was used, the engine ticking over just fast enough to prevent the battery running down. This gave power to operate the lighting, the fan and the A.C. pump for the water supply.

The above is a rough idea of the construction of the vehicle. The whole was constructed locally by the workshop company of the brigade and the equipment was locally acquired.

*Equipment.*—(1) Three panniers: (A) A drug and anæsthetic pannier. (B) A dressing pannier containing bandages, pre-sterilized drums of dressings and Cellona plaster bandages. (C) An instrument pannier which contained the instruments carried in the Operation Theatre of an M.D.S.

(2) 1 Yakdan containing primus stoves, basins, hot-water bottles, etc.

(3) 1 Indian transfusion box, 1 infusion supply box.

(4) A folding table, chair, Thomas and Kramer wire splint, 2 cisterns mule, 2 trestles, 1 stretcher.

*Personnel.*—1 officer, 1 B.O.R., 2 drivers (R.I.A.S.C.), 1 ambulance sepoy, 1 nursing sepoy, 1 sweeper.

*Employment.*—When it became obvious that the tank brigade was going to be employed in slowly moving jungle warfare under quite different conditions from what was in operation in the desert, an attempt was made to adapt the use of the mobile dressing post to this type of warfare. I was in charge of the vehicle when it was employed during the fighting around Imphal in 1944, when it was attached to the A.D.S. of an Infantry Field Ambulance.

The routine was that when the vehicle was parked the canvas flaps were rolled down to form pent houses and the equipment was put under one side. The other pent house was used for accommodating casualties. We were ready to receive casualties within three minutes of parking.

The B.O.R. was employed inside the vehicle. The nursing sepoy was in charge of the sterilization of instruments and the preparation of splints. This he did in the penthouse. The ambulance sepoy and second driver carried stretcher in and out of the vehicle. This required a certain amount of practice, but eventually worked very smoothly. The sweeper cleaned out the vehicle between cases.

*Advantages.*—(1) The great advantage, of course, was its mobility. It was originally attached to an A.D.S. expecting a large number of casualties but when this did not materialize the vehicle was moved to another A.D.S. some thirty miles away. The whole operation of closing down, moving and opening up again ready to receive casualties took less than two hours.

This A.D.S. was situated in an unprotected site and the usual procedure was that at dusk the A.D.S. closed down and moved back to a defended box about a mile back for the night. The mobile dressing post had the advantage of being able to remain open until the last moment, while the rest of the A.D.S. packed up and marched back to the box.

(2) The seriously wounded cases were dealt with by the mobile post and it was a clean, quiet place where an anæsthetic could be given, immediate life-saving surgery performed and the patients prepared for evacuation over difficult terrain.

No attempt was made to do any major surgery such as laparotomies, partly because there was a surgical team working some three miles behind and partly because we had no high-pressure autoclave.

(3) The mobile post was invaluable for use after dark as it could be completely blacked out. It was completely waterproof, a great asset during the monsoons.

*Disadvantages.*—(1) The great disadvantage was moving around bad roads especially under monsoon conditions. It was actually used during the monsoons and it was surprising the places the vehicle could get to. The essentials for this were a good driver, a well maintained vehicle and the using of skid chains. On occasions when we got stuck we got the assistance of passing armoured carriers. It could certainly go as far forward as ambulance cars. Where it was employed casualties came to us from the R.A.P. on jeep ambulances and, after being dealt with, the casualties were transferred to ambulance cars for evacuation back.

(2) The great problem was getting the vehicle dug in, especially as protection against shell fire, for the level of the floor is several feet above ground level. This we accomplished by digging into the side of a bank, but this required a lot of very hard labour. Once we persuaded a passing bulldozer to do the digging for us. If some form of armoured plating instead of wood had been used for the side walls of the vehicle this would have helped matters.

We once thought of converting an armoured ambulance car into a mobile dressing post, but such ambulance cars are too narrow.

(3) The space inside the vehicle was strictly limited. I dispensed with the use of the operation table using the stretcher on trestles instead. The maximum number we could have inside the vehicle was four people besides the patient. We were, of course, dependent on the A.D.S. to which we were attached for the resuscitation of patients before operation, for post-operative care, for organizing the evacuation and for supplies of drugs and dressings.

*Conclusions.*—It is suggested that mobile dressing posts could be used as a valuable mobile reserve to reinforce A.D.S.s quickly. It could be used as a mobile R.A.P. attached to a column on the move. It could be modified for use by mobile surgical units and advanced sections of C.C.S. A vehicle belonging to a C.C.S. or Field Ambulance can be rapidly modified by the local workshops and kept in readiness for use.

My thanks are due to Lieutenant-Colonel M. L. A. Dewan, I.A.M.C., for permission to forward this article for publication.

## SURGERY IN ADVANCE OF ROAD-HEAD.

By Major T. G. LOWDEN,  
*Royal Army Medical Corps.*

[Received June 21, 1945.]

FIELD Ambulances had been moving on a mule pack basis and evacuating their casualties by ambulance mule since the early days of the Gothic Line battle. Field Surgical Units were in the usual course of events kept as integral parts of surgical centres at Field Dressing Station or C.C.S. level but, with an extremely long line of evacuation in mountains, too much delay would result from keeping to this plan. This winter (1944-45) they often returned to the system which was used so successfully in the desert and went up to the M.D.S. to form an Advanced Surgical Centre there. On one of these occasions such an M.D.S. suddenly moved some miles ahead of the road. Five bridges across the narrow valley were blown in succession and there was enough work in rebuilding them to tax all our resources for a fortnight. Meanwhile casualties were occurring steadily and were faced with a ten mile carry by mule to road-head, and then twenty miles by road. It was apparent that they were likely to suffer severely from such an appalling pre-operative journey and it was therefore proposed that the Field Surgical Unit should go forward to join the M.D.S., moving on a mule pack basis also.

The possibility had been discussed before, in conjunction with another F.S.U. which had been in a similar situation, and loading lists roughed out. Nevertheless, with only eight hours' notice to move, the reorganization had to be prompt. The problem of moving a complete operating theatre under the restrictions imposed by mule transport appears rather formidable, but it is surprising how small a quantity of equipment is really necessary. Operating table, lighting set, tentage, any instruments not in everyday use or absolutely necessary and—not least—personal comforts were ruthlessly rejected. Everything had to be boxed in the standard box or pannier, or else be small enough to be roped up into about the same space. All loads had to weigh the same to within a pound or two so that they would balance one another. Loads had also to be arranged so that the unit could lose a box, or lose a complete mule load, without impairing the efficiency at operation; yet there are few duplicates in the A.Fs. I1248 and G1098 and there was no time to obtain any. Mules, we were told, are temperamental animals and may well reject some of the equipment on their own initiative, apart from the possibility of loss by enemy action.

On each occasion the F.S.U. concerned has arranged its own loading lists and the two were found to differ considerably in detail, while keeping to the broad principle of dividing the instruments, expendables, lighting, and heating apparatus and distributing them all along the line. It was found that this could be carried too far if one were not careful, and the embarrassment of unpacking all boxes at once to get an efficient operating set together had to be avoided. It is not recommended that a hard and fast loading list should be adopted, as surgeons differ in their ideas of what is vital, and requirements vary from time to time anyway. This particularly applies to nursing equipment.

Fourteen mules, each carrying one hundred and sixty pounds, carried operating and resuscitation equipment and nursing necessities to deal with an ordinary influx of a brigade's casualties for five days. Further supplies, at the rate of one mule load for twenty to thirty casualties, could be relayed to the unit during this period. Blood was brought up when necessary by a runner.

The operating team, much to its relief, I believe, was not required to ride the mules. It walked beside them. It was expected to do the loading of the animals, to unload any that fell, and reload when the muleteers had got them on to their feet again. The team readily

took to the new form of progress, and learned to rope up and load the mules with enthusiasm. Even the six or seven mile march, mostly through knee-deep mud in heavy rain, merely served to spur them on, and at the end of it they set up the operating theatre and were ready for work within two hours of arrival. The loads were protected where necessary from the mud, as some of them were thrown off when any difficulty cropped up. One of the boxes was thrown down a steep slope into a heavily mined area, and it was two days before it could be recovered with the help of the sappers. This was an unanticipated justification for not putting all one's eggs into one basket.

Sufficient publicity has already been given to the difficult country over which the Gothic Line battle was fought for it to require any further description. The journey for the surgical unit presented no special features which are not experienced by all supplies. Very deep mud was the principal hazard and we were unfortunately compelled to keep strictly to a narrow path because of mines. The track had been swept two days before and the side of it was still lined with mines of every description that had been lifted. The operating team was distributed along the mule train to handle the loads when the mules fell, for the muleteers take no responsibility for the loads.

The F.S.U. was attached to the light M.D.S. of an Indian Field Ambulance. Its parent body was the main M.D.S. nearly thirty miles away, and it was constituted when the emergency arose by moving an A.D.S. up on mules to the isolated village. Its equipment also, therefore, was limited by the conditions of pack transport and in fact could be little more than an effective post for staging and triage. It did also maintain plasma and other supplies, was responsible for rationing ourselves and our patients, and was a constant standby for extra blankets and other equipment had we needed them. We are unlikely to forget the extremely cheerful, helpful, and efficient way this Indian unit undertook the extra responsibilities we occasioned, when they were already working hard under difficulties themselves. Their assistance in "showing us the ropes" made the whole thing possible.

They provided us with the two most weatherproof rooms in the building for operating theatre and holding ward. Improvisation had its day in setting out the theatre. Two abandoned plant pot stands made admirable bowl holders and the minimum of buckets was soon added to by the plant bowls themselves and an old tub found in the village. Stoves collected from surrounding ruined cottages reinforced the two Valor stoves which had come with us (each protected by made-to-measure packing cases). It was December and keeping theatre and ward warm was one of the major problems. Window lighting, hammer, nails, and saw were required to effect minor repairs to the building. Tiles were taken from other buildings to improve the roof.

Three pressure lamps arranged at the apices of an equilateral triangle with two to three foot sides give enough light for all ordinary operating. It is necessary to add a headlamp working off dry cells for deep abdominal work. Operations were carried out on a stretcher put on boxes piled to the required height. Only small camp tables could be carried and instrument trays were laid out on other boxes covered with waterproofing.

All F.S.U.s have equipment for resuscitation on the A.Fs. I1248 and this was taken entire. Resuscitation duties were shared between the Anaesthetist and the Company Commander of the Field Ambulance, whoever was more readily available. Two pints of blood came up with the packs on the first day. A small bank was obtained from the relatives of a civilian casualty who was one of the first patients, and more blood was carried up from the main M.D.S. as required. We maintained a bank of two or three pints. It was kept in wet sacking in a cold room with one wall blown out and there was no danger of its temperature rising seriously. Enough plasma and saline were brought originally but there was never any difficulty in relaying supplies.

We were reminded afresh that a sphygmomanometer reading may of itself be no indication of the state of a patient who has been very recently wounded—and may even be deceptive. Men hit by near-by shell bursts came in with B.P.s which were normal, or even slightly raised. Although in some of these the diastolic was low this was not constant. It is well recognized

that these cases are liable to collapse, especially on induction of an anæsthetic, and they were sent to theatre with a drip established. Pressure readings were taken by Captain Reynard as he gave the anæsthetic and in spite of the accelerated drip a fall of 10 or 20 mm. may take place in the course of a few minutes. If a transfusion is already going the fall can usually be controlled. If it is not, the few minutes' delay in "organizing" it may be of great importance.

The unit operated for a fortnight and during this time almost every variety of battle casualty was treated. Two abdomens, two amputations, the usual incidence of compound fractures, and open chest wounds were included. The centre was about three miles behind the F.D.L.s, and casualties arrived by mule, were operated upon, stayed one or two days and, if fit, were evacuated again by mule to the road head. The more serious ones were held indefinitely, of necessity. Once or twice the unit was under very close shell fire and once we finished an operating list by making repairs to the ward and theatre. A certain amount of damage was done, but it was rapidly made good. We never "went out of business" for more than an hour, even after the hit, and fortunately no case was re-wounded.

Operating and nursing under these conditions is admittedly bad from the surgical point of view. Neither patients nor surgical team should be unnecessarily submitted to the distractions of enemy attention in the ordinary course of events. It has been maintained that the disturbance caused even by our own gun areas is detrimental to the recovery of serious casualties. Under these special circumstances, therefore, when these disadvantages were inevitable, it was interesting to observe the reactions of the patients. All were Indians (Indians are by no means more phlegmatic than British troops) and during the worst time it was fortunate that most of them happened to be under an anæsthetic for their delayed sutures; but of the others and of all on other occasions there seemed to be little harm done. They seemed to take the noise and disturbance as a matter of course. We never saw any sign of unhappiness other than that occasioned by their wounds.

It is necessary to ensure much more secure fixation of even simple flesh wounds when they are to be evacuated post-operatively by mule, as the journey in a litter is an extremely irregular one and sometimes very severe shaking occurs. A route which is impassable for an ambulance jeep can be guaranteed rough and at times hair raising. In spite of this cases travelled well and arrived at the C.C.S. in good condition. Gases were, however, held at the Advanced Surgical Centre who would have been evacuated had M.T. been available. We did not attempt, for instance, to send a man with a Tobruk plaster down in a litter, though a thoraco-humeral plaster went comfortably. Litters have no fitments by which a Thomas' splint can be stabilized. The Rodgers modification of the Tobruk, which uses a stand for the lower end of the splint (though at least as good as the suspension method on an ordinary stretcher), will not give enough security against bouncing on an ambulance mule. Also, litters are shorter than stretchers, and the splint would overlap. Holding these cases for the arrival of ambulance cars deprived some of them of the prospect of delayed primary suture, but was inevitable.

In fact, we tended to hold all cases longer than we would have done further back. No case which went to theatre was evacuated within twenty-four hours. We wanted them as fit as possible before continuing their ordeal, and also we wanted their plasters to be thoroughly set.

Our amputations were held for four days, their top dressings changed in theatre on the fourth day, and their new dressings wrapped in plaster. Their stumps were also steadied by rolled blankets after they were put in the litter.

Two sucking wounds of chest were held until the ambulance cars were through. One would have been held any way as he had a laparotomy. They were aspirated every second or third day and given intrapleural penicillin in the usual way. There was in fact very little unusual in the type of case or post-operative treatment, except that being compelled to hold cases for this length of time enabled us to do delayed primary sutures on incidental wounds and the two chest wounds. All these did extremely well and my chief regret is that I did

not do it on more of them. When one must hold them fourteen days willy-nilly it is an obvious advantage for them to be evacuated with their wounds quite healed. I saw two chest cases after our return to the C.C.S. when they were on their way down. They were ambulant.

Twenty-seven cases were operated upon; all received within eight hours of wounding. Regimental S.B.s were experiencing serious difficulties in getting cases back to R.A.P., and the statement that the line was three miles away does not give a fair idea of the conditions. There were long hand-carries to mule head over steep and muddy mountain tracks mostly under direct enemy observation. Had these men been sent down to the rear M.D.S. for operation they would have suffered severely, and at least two would have died.

We legislated for considerably more than twenty-seven. The original loads of expendables were less than half exhausted when we were relieved by the completion of a jeep-track to the village. We returned to rear M.D.S. by jeep. A jeep trailer carries approximately three mule-loads. Its payload is a thousand pounds but this weight of surgical equipment is too bulky and would overflow. Four jeeps (two with trailers) were sufficient for the return in comfort ; but we left all our expendables behind for the relieving unit.

Nothing was taken or required which does not appear in the A.Fs. G1098 or I1248. We did wish, however, that all the boxes and panniers were furnished with the chains and rings which appear on the Field Medical and Surgical Panniers. These latter are easily loaded on to the saddle and save time when getting ready to start. We were assured it is wrong to keep mules standing in very cold rain for a long time before the journey ; and we appreciated that point of view ourselves.

THE N.C.O. AS A PSYCHIATRIC CASUALTY.  
A STUDY OF 627 CASES ADMITTED TO A PSYCHIATRIC HOSPITAL.

By Captain M. SIM,  
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[Received May 28, 1945.]

MILITARY psychiatric casualties, when classified according to rank, are usually divided into two groups—officers and other ranks. The latter, however, contains an important subdivision—the N.C.O.—and a special study of this sub-group should prove interesting, for a man who has shown the efficiency and keenness to earn a stripe and to keep it, who has the confidence of his officers and is regarded by them as fit to undertake responsibility, might differ in some respects from the average O.R. admission to a Psychiatric Hospital. How he might differ is very difficult to assess with accuracy but one can learn what psychiatric disabilities he is subject to and how he reacts to them.

To aid uniformity in selection of cases, those investigated were confined to British N.C.O.s, for among them the conditions of the tenure of rank are reasonably standardized and, what is equally important, diagnosis could more accurately be ascertained. For nearly one and a half years, a Base Psychiatric Hospital drew material of all kinds from all over the Middle East and handled the bulk of psychiatric cases occurring in this theatre. The factors common to these N.C.O.s were: (1) They were all British. (2) They were representative of all branches of the Service stationed in the Middle East. (3) They were originally in medical categories which did not prevent their being posted overseas. (4) They represented groups of men who had been exposed to all the psychiatric traumata that a stay in the Middle East could produce, in many cases including battle stress. (5) The psychiatrists determining the diagnosis, treatment and disposal had had previous wartime experience with British troops and had established their own constants.

In all, 627 British Army N.C.O.s were investigated, with the following results:

(A) The distribution according to rank, and the number of Category E cases, was found to be as follows:—

		Number of E cases	Average age of E cases
W.O.1	.. 6	1	39.3
W.O.2	.. 35	11	
S/Sjt.	.. 35	10	30.9
Sjt.	.. 143	33	32.69
L/Sjt.	.. 13	1	
Cpl.	.. 204	37	31.15
L/Cpl.	.. 191	34	28.60

There is a steady diminution in the number of category E cases as the lower ranks are approached, and there is a correlation here with age. It would appear, therefore, that the lower one came down in the scale, the more likely was that person to be returned to some form of duty, and this could be explained in part by the younger age. The actual correlation between the percentage of E cases and the average age is 0.94.

(B) The average age is 30.29 years, mean deviation 5.41 years. 23 per cent fall within 20–24 age-group, 29 per cent in the 25–29 group, and 19 per cent within the 30–34 group. 454 or 72.40 per cent were under 35. 173 or 27.60 per cent were 35 or over. 73 or 11.65 per cent were 40 or over.

(C) Length of service: It was seen that 55.8 per cent of cases occurred among personnel who had joined the Army since the outbreak of war. The others consisted of Regulars, Territorials and Reservists.

(D) An analysis of the number of days spent in hospital according to the diagnosis showed that 243 cases of anxiety spent an average of 31·71 days ; 134 cases of hysteria an average of 32·79 ; 45 of depression averaged 34·36 ; 28 of psychopathic personality 32·07 ; 4 of schizophrenia 34·22 ; 3 epileptics 19·33 ; 7 neurasthenics 43·71 ; 3 with post-concussional syndrome 20·67 ; and 2 with obsessional neurosis an average of 36·50 days.

Category E cases were excluded from this analysis as these often remained in hospital for a long time because there was no ship to take them home. It can be seen that in the first five groups the average stay in hospital is reasonably uniform, and has therefore little relation to the diagnosis.

(E) Classification according to units was as follows :—

Base .. .. .	170	R.E.M.E. .. .. .	18
Infantry .. .. .	142	R.A.O.C. .. .. .	17
Artillery .. .. .	118	C.M.P. .. .. .	15
Tanks .. .. .	47	R.A.M.C. .. .. .	11
R.A.S.C. .. .. .	46	Pioneer Corps .. .. .	4
R.E. .. .. .	20	Army Photo. Unit .. .. .	1
Signals .. .. .	18		

Base and H.Q. personnel included all branches of the Service irrespective of their regiment or corps, i.e. infantry, artillery, R.A.S.C., etc. The high incidence of these cases is not surprising for many a man who is not considered fully fit for front-line duties is sent to Base or H.Q. probably on the advice of the M.O.—an interesting example of Selection.

The large number of combatant infantrymen leads to speculation and it has been suggested that the infantryman is a more isolated fighter and has not the feeling of collective security enjoyed by a gun or tank crew.

(F) The disposal of the cases by categories showed :—

Of 260 cases of anxiety state, 120 remained in the same category ; 47 became B1 Base ; 22 B1 Base for three months ; 5 B1 Base for six months ; 39 B1 Base Permanent ; 1 B6 Base Permanent ; 2 B2 Base Permanent ; 1 Bx2 Base Permanent ; 1 Bx1 Base Permanent ; 5 Category C and 17 Category E.

Of 148 cases of hysteria, 92 remained in the same category ; 19 became B1 Base ; 3 B1 Base for three months ; 17 B1 Base Permanent ; 1 B3 Base Permanent ; 1 Bx1 Base Permanent ; 1 Category C and 14 Category E.

Of 79 cases of depression, 41 remained in the same category ; 2 became B1 Base ; 1 B1 Base Permanent ; 1 Category C and 34 Category E.

Of 55 cases of psychopathic personality, 19 remained in the same category ; 4 became B1 Base ; 1 B1 Base for three months ; 1 B1 Base Permanent ; 3 Category C and 27 Category E.

Of 27 cases of schizophrenia (11 paranoid) 4 remained in the same category and 23 became Category E.

Of 4 cases of epilepsy, 3 remained in the same category and 1 became Category E.

Of 7 cases of neurasthenia, 3 remained in the same category ; 1 became B1 Base Permanent ; 1 Bx6 Base Permanent, and 2 Category C.

Of 5 cases of post-concussional syndrome, 3 remained in the same category, and 2 became Category E.

2 cases of obsessional neurosis remained in the same category.

Of 40 miscellaneous cases, 26 remained in the same category ; 1 became B1 Base ; 3 B1 Base Permanent ; 1 B3 Base Permanent and 9 Category E.

A study of these figures shows :

(1) 50 per cent show no change in their medical category, i.e. it was the same in discharge as on admission.

(2) 127 or approximately 20·2 per cent were not retained in the Middle East.

(3) Under "depression" are included all cases falling into the manic-depression group—mania was rare.

(4) 514 or 81·98 per cent of cases fall within the four main groups—anxiety, hysteria, depression and schizophrenia.



(5) Total incidence of schizophrenia is 27 but of these 11 belonged to the paranoid type group and some of these showed little schizophrenic deterioration.

(6) The "miscellaneous" group which accounts for 40 or 6.37 per cent was a very mixed "bag" including 4 cases of enuresis; 3 of alcoholism; 3 chronic bronchitis; 2 battle exhaustion; 1 dull and backward; dyspepsia, migraine, vertigo, drug addiction, telegraphist's cramp, amœbiasis, bronchiectasis, etc.

(7) The factors determining a man's disposal may not be entirely dependent on the clinical picture, e.g. when the hospital was extremely busy and shipping scarce a man who normally would have been placed in Category E and sent home would be discharged to Base Depot for light and non-combatant duties. Many personnel discharged thus gave satisfactory service for upwards of six months and fully justified the emergency measure. Only 17 of those sent back to duty were readmitted within a year, but this does not exclude the possibility of some being admitted to other Psychiatric Units.

#### DISCUSSION.

These figures would be more valuable if they could be compared with the figures of the actual number of troops in the Middle East, but such a comparison is fraught with difficulties, for many neurotic soldiers were admitted to general hospitals by virtue of demonstrable somatic diseases, such as hyperacidity and rheumatic conditions. While shipping and man-power problems did affect the disposal of a number of N.C.O.s the tables show that he is a fairly good subject to treat and his recovery rate is satisfactory. The diagnosis of the cases was made on purely psychiatric grounds and it can be seen in paragraph (F) that the incidence of anxiety states and hysteria is high, while that of depression and schizophrenia is low. That is what one would expect in an active theatre of war—more neurotics than psychotics, but the incidence of schizophrenia—16 out of 627—is lower than one usually meets in a Base Psychiatric Unit and was certainly lower than the incidence shown in the hospital quarterly return for all other ranks. It appears that the British Army N.C.O. has got some distinctive features—a low incidence of schizophrenia with a relatively high one of depression and almost twice as many cases of anxiety as there are of hysteria. It can be summarized by saying that the British N.C.O. even as a psychiatric casualty demonstrates the super-ego qualities which presumably were in some degree responsible for his promotion.

#### SUMMARY.

627 admissions of British N.C.O.s into a Base Psychiatric Hospital in the Middle East (from March, 1942, to September, 1943) have been investigated. They present a disease incidence which is marked for its small number of cases of schizophrenia.

I have to thank Colonel Hogarth Kerr, *T.D.*, *M.D.*, for his interest and helpful criticism and for his permission to forward this paper for publication and also Lieutenant-Colonel W. H. de B. Hubert for his encouragement and advice.

[It was the rule that cases were placed in "Category D" and sent to U.K. for final disposal. Wherever "Category E" is used in this article it means that the patient was evacuated from the Middle East, but does not necessarily mean that he was invalided out on arrival in the United Kingdom.—EDITOR.]

## AN EPIDEMIC OF SCRUB TYPHUS.

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THIS is an account of a series of cases of scrub typhus occurring in the Chin Hills, Northern Burma. 225 cases amongst B.O.s, B.O.R.s and I.O.R.s, were admitted to the hospital from October to December, 1944. This was a medical unit working forward, at one time within shelling range of the enemy. Owing to the difficulty of communications and other military exigencies it was not possible to send specimens of blood for the Weil-Felix reaction, so that diagnosis was made purely on clinical grounds. However, as the war is moving rapidly into areas where the disease is endemic, and likely to be epidemic, and as the same need for early diagnosis on clinical grounds will exist, it is thought that a description of the signs and symptoms will be of value to medical officers in forward areas, particularly as some features of the disease are not mentioned in standard textbooks. Of the 225 cases, 41 were amongst B.O.R.s, and these latter have all been described in detail, the others following essentially the same course.

*Epidemiology.*—Scrub typhus (syn. mite typhus, K typhus, tsutsugamushi fever) is a rickettsial disease, the organism responsible being *R. orientalis*. At present the available evidence points to the transmission of the infection by the bite of the infected larval mite *Trombicula deliensis*, and the existence of a reservoir of infection in field mice, rats, bandicoots and other rodents. The virus is transmitted from one generation of mite to the next and, unlike the louse, the mite is not killed. 1 in 2,000 mites are thought to be infected.

*Incubation Period.*—Four to fourteen days, usually about ten days.

*Clinical Picture.*—The onset was sudden in two-thirds of the cases and insidious in the others, with the history of two or three days' malaise, headache and fever. On or about the third day of the illness the temperature rose to 102° or 103°, the patient became very ill and soon presented the classical typhus facies, i.e. extreme prostration and weakness, mental apathy, flushed face, injected conjunctivæ, and filthy, dry, crusted tongue and mouth. He complained of severe headache, usually frontal but occasionally occipital, constipation, anorexia and was usually extremely apprehensive.

*Eschar.*—Fourteen cases, i.e. 34 per cent, had a primary bite or eschar, usually a shallow, yellow, punched-out ulcer and often with scab formation. The ulcer was always single and the most common sites were the hand, ankle, knee, scrotal area and umbilical region, in that order.

*Lymphangitis* was conspicuous by its absence in all cases.

*Lymphadenitis* was present in all cases and was generalized, the glands affected being the axillary (90 per cent), inguinal (85 per cent), cervical (70 per cent), epitrochlear (27 per cent), and occipital (10 per cent). They were discrete, rubbery, firm and sometimes tender, particularly those regional to the eschar, if present, and palpable on the third day of fever.

*Rash.*—All cases but one had a dull red rash, which was macular in 30 cases, maculopapular in 7, papular in 2 and morbilliform in 1. It appeared first on the back, chest and abdomen, then on the arms, legs and face; the palms and soles were free in all cases. The day of appearance of the rash was second to fifth day, usually the fourth (45 per cent).

*Spleen.*—Palpable 14 cases (34 per cent).

*Duration of Fever.*—Varied from eleven to twenty-five days in uncomplicated cases.

Termination by lysis commenced at the tenth to seventeenth days, usually the fourteenth day (43 per cent).

In two cases the fall occurred by crisis, on the eleventh and fifteenth days respectively. The temperature is sustained until lysis occurs; in the fatal cases there was a sudden drop in temperature accompanied by collapse and followed by a terminal rise. In four such cases this took place on the thirteenth, fourteenth, fifteenth and twenty-first days respectively.

## Complications.

(1) *Malaria*.—There were 3 cases of B.T. malaria, of which one started as malaria. The other 2 developed malaria during the disease. There was one case which was started as M.T. malaria.

(2) *Chest*.—(a) In 32 cases (80 per cent) there were mild respiratory complications throughout the illness, viz. cough with slight bronchitic signs and little or no expectoration (probably due to mediastinal gland enlargement).

(b) *Pulmonary infarction*.—This occurred in 7 patients in the third week of the illness. There were 4 cases with an acute onset of pain in the chest, cough and bright red hæmoptysis followed in 2 by pleural effusions. Two had pain and cough only, but as one of these was found post-mortem to have a peripheral infarct at the base of the lung one may assume that infarction had occurred in the other. The seventh case had no cough or hæmoptysis and only complained of pain in the epigastrium, but was found to have a medium sized infarct on the diaphragmatic aspect of the right lung post-mortem. It seems possible that small peripheral infarcts may be present in more cases than have clear-cut symptoms and may be responsible for the respiratory signs noticed in so many cases.

(c) *Lobar pneumonia* occurred in one case on the eighteenth day and ultimately proved fatal.

(3) *Pharyngitis, laryngitis and tonsillitis* occurred in 4 cases and was of a non-specific nature. Repeated swabs were negative for K.L.B., and Vincent's organisms. There was a little accompanying pyrexia and the condition cleared up as the patients' general condition improved.

(4) *Deafness* was present in 50 per cent of cases. It is debatable whether this was due to the typhus or to the quinine which the patients received as part of the routine antimalarial treatment. However, many of these patients complained of deafness before receiving quinine and it seems that this is a helpful diagnostic point.

(5) *Retention of urine* occurred in 5 cases, all in the third week of the disease, but was relieved in two or three days after catheterization. Incontinence was a terminal feature of the fatal cases.

(6) *Mental symptoms* were prominent in 5 cases, the main features being delusions, visual and auditory hallucinations and a muttering delirium. These cases all made good recoveries, so that the onset of mental confusion does not necessarily seem to be of bad prognostic significance.

(7) *Femoral thrombosis*.—There was one case, which also had pain in the left iliac fossa and splenic area. He had a very painful and tender spleen, but made an uneventful recovery. It is possible that the thrombosis was affecting both the left iliac and splenic veins.

(8) There was one case each of epistaxis, photophobia, bacillary dysentery, metatarsalgia, vomiting, neuritis (this was an ulnar neuritis affecting the inner  $2\frac{1}{2}$  fingers of one hand which cleared up spontaneously in four days leaving only a slight residual numbness). One interesting case developed a rib abscess after running a swinging temperature after his illness had apparently subsided. Aspiration revealed sterile pus but unfortunately this case had to be evacuated before further investigation could be carried out.

*Mortality*.—In 225 cases there were 12 deaths, i.e. 5.3 per cent. Amongst the British personnel there were five deaths, i.e. mortality of 12 per cent. These latter were troops who had fought an arduous campaign in the worst conditions and who had been in action continuously for many months; one imagines that the general resistance was low and 3 of those who died were of poor physique. It is debatable whether the psychological element of fear played any part, but it was noticeable that to the whole Division "typhus" was a word of dread and the average B.O.R. preferred the Jap. One wonders whether this fear element contributed to higher mortality amongst the more imaginative British troops.

Death was due most often to cardio-circulatory failure, the onset being heralded by sudden collapse with a drop in temperature, cyanosis, dyspnoea and rapid thready pulse. This appears to be both a central and peripheral phenomenon due to toxæmia. In one

case the onset of lobar pneumonia was sufficient to tip the scales in a patient who otherwise would have had a chance of recovery.

*Differential Diagnosis.*—The most practical points in the early diagnosis were to distinguish from (i) Malaria ; (ii) Typhoid (the rash, the severity of the illness after only one week's duration and deafness were noticeable differences) ; (iii) Secondary syphilis ; (iv) Dengue and sandfly fever ; (v) Bubonic plague ; (vi) Generalized septicæmia.

*Pathology.*—White cell count was of little value ; in some cases there was mild leucopenia, others were normal.

Post-mortem the changes found were :—

*Brain* : Cerebral oedema and congestion ; in one case the brain was extremely friable.

*Heart* : Naked eye—small, pale and toxic looking with a slight pericardial effusion. Microscopically—mononuclear infiltration between the muscle fibres.

*Lungs* : All cases showed a slight terminal hypostatic congestion ; in one case pulmonary oedema was present. One case had a medium-sized well organized basal pulmonary infarct, and consolidation of the whole of the lower lobe of the other lung (this in spite of treatment with sulphapyridine and penicillin).

*Liver* : Pale and 'toxic' looking ; enlarged in one case. Microscopically—the liver cells were not as compact as usual and were intensely granular. Intra-lobular spaces were dilated and contained granular material. No malarial pigment was present.

*Spleen* : There was enlargement in 2 cases and the picture was one of congestion, both naked eye and microscopically.

*Adrenals* : Slight decrease in adrenal cortex.

*Lymph-glands* : Enlargement of the tracheo-bronchial and mediastinal lymph-nodes was present ; the mesenteric glands were normal. The whole picture was that of severe toxæmia.

*Treatment.*—*Preventive measures* were dictated by military necessities, and consisted of regular sprayings of clothes and tentage with dimethyl or dibutyl phthalate, and avoidance of bashas and sites used by the Japanese if this was possible. From all available evidence it seems that the insecticides were of some value but many of the earlier cases were contracted before a regular drill was instituted. It would have been interesting to see the effect of D.D.T. on the incidence of the disease had it been available at that time.

*Movement.*—It was noticed that cases which had been transferred from other medical units over very bad roads did much worse than those who were admitted directly. The establishment of a hospital so far forward proved to be a success and was implemented by final evacuation by air. The convalescent patients travelled extremely well by air ; even those who had to be flown out when still seriously ill were found to be no worse at the end of their journey. It is very important that typhus patients should not be moved if they can be nursed on the spot, and at the outbreak of any future epidemic one hopes that their retention in a forward medical unit with good nursing facilities will be possible again.

*General nursing* by well-trained personnel is the most important factor. This Unit was fortunate in having three nursing sisters whose work was invaluable. Each patient required individual attention, and the skill and experience of the Sisters and Nursing Orderlies did much to lower the mortality.

*Fluids.*—The level aimed at was 8 to 10 pints of fluid in 24 hours. Fortunately the site of the hospital was over 5,000 ft. above sea-level and sweating was at a minimum ; in hotter climates one would aim at 16 pints daily. To every pint of water, lime juice, Horlicks, etc., 20 grains of salt were added.

*Diet.*—The daily calorie intake was 2,400. This could be attained by a diet consisting of milk 3 pints, bread 4 ozs., meat 8 ozs., sugar 4 ozs. and lime juice 8 ozs. The fact that all supplies had to be dropped by air meant that the amount of meat and bread often varied, and glucose drinks and extra milk were given instead. The patients were encouraged to eat all the time, and extras such as biscuits, jam, tinned fruit, vegamite, etc., were supplied. All cases were given ferrous sulphate, grains 3 b.d., and multivite tabs., 6 for five days, then 2 daily.

*Oral Treatment.*—Was a necessity in all cases. The worst mouths had to be cleaned every hour with hydrogen peroxide and/or borax and glycerine. Thanks to efficient routine

no case of parotitis occurred and it is suggested that in every case thorough oral hygiene be carried out not less frequently than two-hourly. Pharyngitis was often severe and was treated with gargles and frequent painting with Mandl's paint. N.A.B. 0.3 gramme i.v.i. was of no value.

*Headache* was a troublesome symptom. A.P.C., grains 15, proved effective; in more severe cases, morphia, grain  $\frac{1}{4}$  with hyoscine grain 1/100, was of value.

*Insomnia* usually yielded to mist. 315, 1 to 2 oz. (This contains pot. brom., grains 15, chloral hydrate, grains 15, and tinct. opii, m 15).

*Cough* was best treated with syrup codeine phosph., drachms 2. Persistent hiccough in one case was effectively stopped by hyoscine, grain 1/75.

*Constipation* was treated by enemas every two or three days.

*Sulphapyridine or sulphathiazole* was given as routine to (a) Cases with chest complications. (b) Patients with retention of urine who had been catheterized. This was effective in stopping secondary infection.

*Lumbar puncture* was done in 4 cases with dramatically successful results. Each of these was semi-comatose, restless, delirious and incontinent. In all cases the C.S.F. was under pressure, i.e. 160 to 180 mm., but with no other abnormalities.

Fluid was let off until the rate of flow reached normal (this was usually from 10 to 15 c.c.) and in a few hours marked improvement was noted with return of the patient to consciousness. In one patient with these symptoms the C.S.F. pressure was normal and lumbar puncture was ineffective. However he improved dramatically after being given one pint of hypertonic glucose saline intravenously and the evidence seems to indicate the presence of a varying degree of cerebral oedema in these cases, a fact borne out by post-mortem evidence.

*Dehydration*.—In spite of repeated exhortations and the attentions of the nursing staff, some of the patients did not drink enough, and as they grew progressively weaker a vicious circle was started. It was found that the use of intravenous N glucose saline was the best method of treating these cases, the amount given varying with the condition of the patient.

*Penicillin* was used in 7 cases. The total dosage varied from 325,000 to 675,000 Oxford units given intramuscularly, but treatment was found to be uniformly unsuccessful. One patient who died had a complete lobar pneumonia in spite of the penicillin he had received.

N.A.B.—0.3 gramme twice in one week was tried in 3 cases and certainly did reduce both the severity of the disease and the duration of the fever. All the 3 cases were completely lysed within sixteen days, but of course too few cases were treated to form any conclusion. However, this treatment seems to be of value and should be worth trying in a large control experiment.

*Antimalarial treatment* was given to all cases as a routine whether or not they had positive blood films. If a sudden rise of temperature in an apparently improving case could not be explained on clinical grounds, four-hourly blood slides were taken, but the absence of the malarial parasite in a film was not allowed to preclude the possibility of a relapse of malaria and it was thought safer to repeat the course of anti-malarial treatment in these cases.

#### SUMMARY.

225 cases of clinical scrub typhus are described, 41 amongst British personnel in detail. The importance of early diagnosis, in order to minimize moving the patient and to obtain good nursing as soon as possible, is stressed.

Points of interest seem to be: (i) The frequency of deafness as a symptom. (ii) The relative frequency of pulmonary infarction as a complication. (iii) The possibility of sudden collapse and death on or about the fourteenth day.

Important points in treatment: (i) Adequate fluids and diet, (ii) Scrupulous oral hygiene, (iii) Lumbar puncture or intravenous hypertonic glucose saline when indicated.

My thanks are due to Lieutenant-Colonel J. Reidy, I.M.S., O.C. of an Indian Casualty Clearing Station, for his encouragement and permission to forward this article for publication, and to Brigadier Crosby, D.D.M.S.

## "FIELD NEPHRITIS" IN THE GERMAN ARMY

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NEPHRITIS as a disease of active service first came into prominence during the American Civil War, when about fourteen thousand cases were recorded. During the last war the disease assumed serious proportions on both sides. In the British Forces it commenced on the Western Front in the spring of 1915. In the German army it commenced in 1916 on the Eastern Front, and only later, and to a lesser degree, affected the armies in the West.

During the second World War nephritis never became a serious cause of wastage amongst the American or British Forces, but the German army appears to have suffered much more severely than during the previous conflict. The disease commenced in the East about the time of the opening of the Russian campaign. Until June, 1941, the monthly incidence of nephritis in the field army had fluctuated around 0.4 per 1,000. From then onwards the curve of incidence rose steadily, to reach a peak in March, 1943, of just over 1.4 per 1,000; this was followed by a decline during the summer, and a further rise during the following winter (fig. 1). In the Balkans cases first occurred in large numbers during the winter of

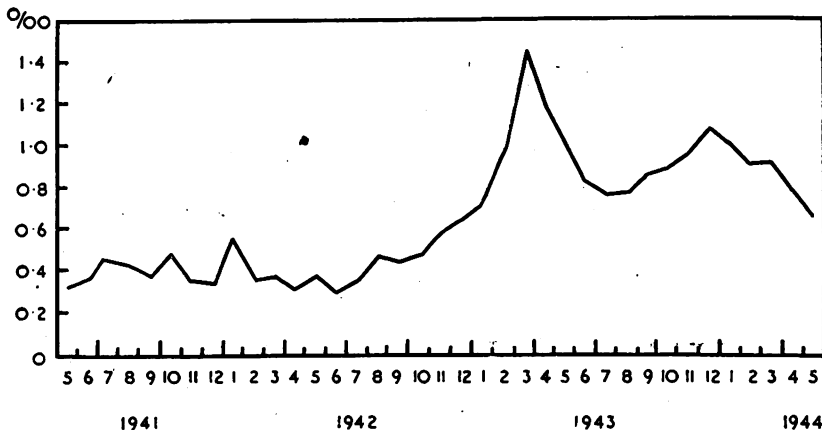


FIG. 1.

Incidence of nephritis in German Field Army (Cases per 1,000 per month).

1943-44, but this outbreak was not nearly so severe as that which followed in the earlier months of 1945, during the retreat from Greece. Between February and April of the present year more than 1,000 serious cases were admitted to one hospital in Zagreb alone.

The majority of German authorities regard the "field nephritis" of this war as an entity, distinct from the acute nephritis of civil practice. Some are inclined to the view that it may be a "new" disease with only a superficial resemblance to the "war nephritis" of the last war. Gutzeit, principal consulting physician to the German army, terms it "infectious nephritis" and describes it as such in a military handbook [8]. Another writer, however, in summing up the views of various authorities [4], remarks that "it is quite plain that many clinical observations made during the present war and regarded as new had been recognized in the first World War."

Facilities for medical research were much more limited in the German than in the British

Army, and although much has been published on "field nephritis" the biochemical and pathological evidence is very incomplete. The scope for speculation was correspondingly wide. Despite the emphasis laid by German physicians on certain features which, they insist, give a distinct character to this malady, its resemblance to the acute nephritis which affected the British Armies on the Western Front in the last war is very close. Bradford, in his account of the latter disease in the Official History of the War [3], expressed the view that it was merely the nephritis of civil practice seen under war conditions, and that its peculiarities were due to the hardships to which its victims were exposed. There is no convincing evidence that the case of field nephritis is in any way different.

#### CLINICAL FEATURES.

Bradford's description of the nephritis which he saw in France from 1915 onwards coincides very closely with the clinical picture of "field nephritis."

The basic syndrome of field nephritis consists of dyspnoea, oedema and albuminuria.

The onset was usually sudden, but might be gradual. Most patients gave a history of having been perfectly fit until the typical symptoms began, but many upon questioning recalled a period of feverishness some three or four weeks previously. The first symptoms were those of dyspnoea or oedema. The onset of dyspnoea was often remarkably sudden, usually in the course of physical effort, the patient being seized with such intense shortness of breath that it was impossible for him to carry on. This symptom was so frequent and characteristic that the condition was often recognized at the outset by the soldier's comrades. In other cases the disease began insidiously, and the shortness of breath was worst on lying down, interfering with sleep [6]. The onset of oedema was, however, the most usual symptom causing the patient to report sick, being present from the beginning in four out of five cases. It generally began rather gradually, in which case it was usually first noticed in the ankles, becoming gross and more typically nephritic in distribution in the course of the next twenty-four or forty-eight hours. A dry cough was often present at the beginning, but sore throat was conspicuous by its absence. Headache, sometimes very severe, was a frequent symptom, which in many cases persisted for several weeks. Vomiting was not very common, and there was seldom any marked loss of appetite.

When first admitted to a medical unit all degrees of the condition might be seen, from mild dyspnoea and transient oedema to patients critically ill with severe pectoral and cardiac distress, with anasarca, or even—and not very uncommonly—uræmic coma with convulsions. To a certain extent the severity of the condition depended directly upon the handling of the case; the effect of transportation over any distance was invariably bad, and patients who commenced a train journey with only mild dyspnoea and no oedema often developed severe waterlogging before reaching their destination. This was attributed partially to the physical conditions of the journey and partly to lack of control over the patient, who could not be kept on the strict regime of absolute starvation which was considered so important.

About one-third of all cases were febrile during the first day or two after admission to hospital. The oedema was generally moderate in degree, and ascites was uncommon except in cases with generalized anasarca. In severe cases pleural and pericardial effusions occurred, and pulmonary oedema, which might be partially interstitial in type with a radiological picture similar to "virus pneumonia" (presumably the same as our atypical primary pneumonia), was found occasionally. Soft swelling of the spleen was said to be an invariable feature of the disease.

The blood-pressure was usually raised to a systolic reading of 140–200 mm. and a diastolic of 100–120 mm.<sup>1</sup> These figures were seldom exceeded, and the systolic pressure was more generally under 180 mm. than above. Bradycardia was the rule, and was regarded as an important distinguishing feature from cardiac insufficiency in cases without albuminuria. Capillary pulsation was marked.

<sup>1</sup>Rudisser[13] stated that the diastolic pressure was lowered in some cases.

The daily urinary output was always diminished. Anuria was not very rare, and not always of serious import. At the outset the specific gravity was often fixed at 1,010, the urine being strongly acid. There was generally a heavy albuminuria, up to 20 to 30 Esbach units per 1,000, and this was usually very persistent; but, as mentioned below, cases without albuminuria also occurred. Erythrocytes were generally present but not in great numbers, although in serious cases gross hæmaturia was not uncommon and sometimes persisted for a week or ten days. Blood casts were practically never found in uncomplicated cases, and epithelial and granular casts seem to have been less frequently present than would have been expected in ordinary acute nephritis.

The blood showed a transient polymorph leucocytosis with a shift to the left in the Arneth count, followed by a lymphocytosis. In the initial stages there was a monocytosis with the presence of plasma cells. Some degree of anæmia developed sooner or later in most cases, but was usually proportional to the loss of red blood corpuscles in the urine. In protracted cases an anæmia of toxic origin supervened, and in some patients with marked œdema the anæmia was attributed to direct injury to the bone-marrow.

The blood showed a diminution in albumin and a very marked increase in serum globulin. The total blood protein figure was increased, and this feature was regarded as characteristic. Unfortunately only a few cases appear to have been investigated fully. Non-protein nitrogen was increased in severe cases, but the urea and uric acid levels were only raised in cases with the greatest renal damage. The blood sedimentation rate was generally increased.

The œdema fluid was very rich in albumin and relatively weak in globulin. In many cases the œdema fluid coagulated spontaneously when drawn into a test tube.

#### VARIETIES OF THE DISEASE.

The characteristic triad of dyspnœa, œdema and albuminuria was only found in fully developed form in something less than 50 per cent of cases [14]. In about 10 per cent the urine showed no abnormality, the only signs being œdema and a raised blood-pressure; these cases were termed "nephritis ohne nephritidis"—nephritis without kidney inflammation. In other cases, which were however rare, the blood-pressure was normal or there was no œdema while in other respects the picture was complete.

#### COMPLICATIONS.

On the Eastern Front in 1943 as many as 30 per cent of cases occurred in combination with trench fever [14], which was very common in the German army. Other cases were complicated by typhus; in such circumstances the mortality was naturally high.

The commonest complications were cardiac failure from pericarditis or myocarditis, cerebral œdema with convulsions, true uræmia and pneumonia. The last was supposed by some to be the same as "virus pneumonia," but the evidence on this point is not convincing.

#### COURSE AND PROGNOSIS.

The case mortality was not high. A pathologist stated that of about 800 cases which he had seen during the Balkan campaign (when the disease was particularly severe) 20 died, but 8 of these were suffering from typhus in addition. The outlook in all cases depended principally upon the facilities for hospitalization and treatment.

Pilgerstorfer [11] gives the following results, based on two years' experience in a hospital for field nephritis in Vienna (number of cases not stated):—

	Per cent
Complete cure .. .. .	58
Trace of residual albuminuria or hæmaturia, still under treatment ..	21.8
Discharged with persistent traces of blood and albumin .. ..	11.6
Left with unimportant elevation of blood-pressure .. .. .	3.8
Residual damage to the kidneys .. .. .	3.6
Transition to chronic nephritis .. .. .	1.2



With rest in bed and absolute starvation the œdema usually disappeared in a surprisingly short time. Estimated quantities of œdema fluid of up to 20 litres had completely gone in less than a week. The average duration in hospital varied from a few weeks to several months. It was generally four or five months before a case was fit for duty, and even then he was generally placed in a low medical category and employed on home establishment. Cases with persistent albuminuria were never sent back to the line, but if a patient remained free of albumin and had no relapses for six months he was generally considered fit for front-line service.

The ultimate prognosis may not be so good as the figures given above may appear to suggest. Pilgerstorfer [12] cites Gros, who in 1928 followed up 211 cases of trench nephritis from the last war. He found that 24·7 per cent had chronic nephritis (including 9 per cent with "contracted kidneys"); 26 per cent had residual signs in the urine and nothing else; 44·6 per cent were free from signs or symptoms.

#### TREATMENT.

Rest in bed, warmth and absence of movement were the first essentials. The deleterious effects of transportation have already been noted.

In the first three days food and drink of every kind was absolutely forbidden, luminal being given freely to allay hunger and thirst. This regime was continued for as much as eight days if necessary. It was followed by a salt-free diet consisting of fruit, rice and potatoes, with butter prepared by kneading in water to reduce its salt content, the fluid intake being restricted. The renal function was estimated by Volhard's method from time to time, and if the results were satisfactory salt was gradually added to the diet, beginning with 3 grammes *per diem*. Some physicians considered that the flushing of the kidneys in Volhard's test had a beneficial action, and repeated the test at frequent intervals partly as a method of treatment [7].

In the early stages circulatory distress was relieved by giving strophanthin once or twice daily,  $\frac{1}{4}$  to  $\frac{1}{2}$  mgm. intravenously, and venesection, from 400 to 800 c.c., was repeated once or twice at intervals of three or four days. Complications such as coma and "eclampsia" were treated in orthodox fashion. In cases in which œdema persisted for several weeks testosterone, thyroxin and potassium acetate were exhibited with apparent good effect. The Vienna school employed urea and potassium acetate in the acute stages, but this was not favoured generally.

#### MORBID ANATOMY.

Pathological material is scarce, but we were fortunate enough to obtain sections of kidneys from four fatal cases. These were examined by Colonel H. L. Sheehan, to whom we are indebted for the following report:—

"Death was stated to have occurred in these cases after 2,  $3\frac{1}{2}$ , 29 and 33 days.

The kidney lesions are very similar to those of trench nephritis in the last war. The condition is a true glomerulitis, not a simple famine œdema.

The earlier specimens (2 and  $3\frac{1}{2}$  days) show a very early acute glomerulitis which might easily escape notice on cursory examination. The glomeruli show undue lobulation of the tufts which are somewhat swollen and occasionally show pouting into the tubule lumen; these changes are more marked in the second specimen. There is a slight increase in the number of endothelial nuclei in the glomerular loops. The arterioles and tubules appear normal and contain no casts.

In the third specimen (29 days) the glomerulitis is more advanced, and the lesions are quite obvious. The glomerular tufts are all swollen and show a considerable increase of endothelial nuclei. There are numerous light non-cellular adhesions between tuft and capsule. The convoluted tubules are moderately dilated and a few contain hyaline casts. The disease was presumably progressing up to the time of death. If the patient had recovered there would have been some permanent histological lesions in the glomeruli.

The last specimen (33 days) shows what appears to be an almost fully recovered glomerulitis. Many of the glomeruli are apparently normal, others show a slight increase of endothelial nuclei and occasional light adhesions to the capsule. The first convoluted tubules are moderately dilated. Hyaline casts are present in a number of second convoluted tubules and in a few of the collecting tubules. The acute disease seems to have lasted only a few days, healing apparently having been in progress for three or four weeks. (This specimen also shows gross hæmorrhage into many nephrons and some interstitial cellular infiltration, probably due to some intercurrent disease causing death; possibly typhus.)

The histological appearances seem to be very similar to those described by Shaw, Dunn and McNee in the trench nephritis of the last war."

#### ÆTIOLOGY.

The great majority of cases amongst our troops in the last war occurred in individuals who had no preceding disorder of the kidneys. Exposure to cold and wet was a factor in practically every case, but occasional instances were recorded in which hospital orderlies and nurses living under good conditions developed the disease. No definite evidence could be adduced in support of the infective theory, and the remarkable freedom from nephritis of Indian troops on the Western front, under conditions which produced large numbers of cases of bronchitis, pneumonia and trench foot amongst them, was considered by Bradford as an argument against the disease being due to an infection [3].

On the German side in the last war some writers (Müller, Jungmann *et alia*) were definitely of the opinion that the condition was due to a specific organism, others considered that wet and cold were the principal factors, others laid stress on focal sepsis or dietary deficiencies. One clinician (Töpfer) suggested that a relationship existed between lice, trench fever, war nephritis, and exposure, and this opinion was resurrected during the recent conflict [4].

Studying the literature on field nephritis, one finds that the only ætiological factor which is beyond dispute is the importance of cold, damp and hardship. The disease was exceedingly

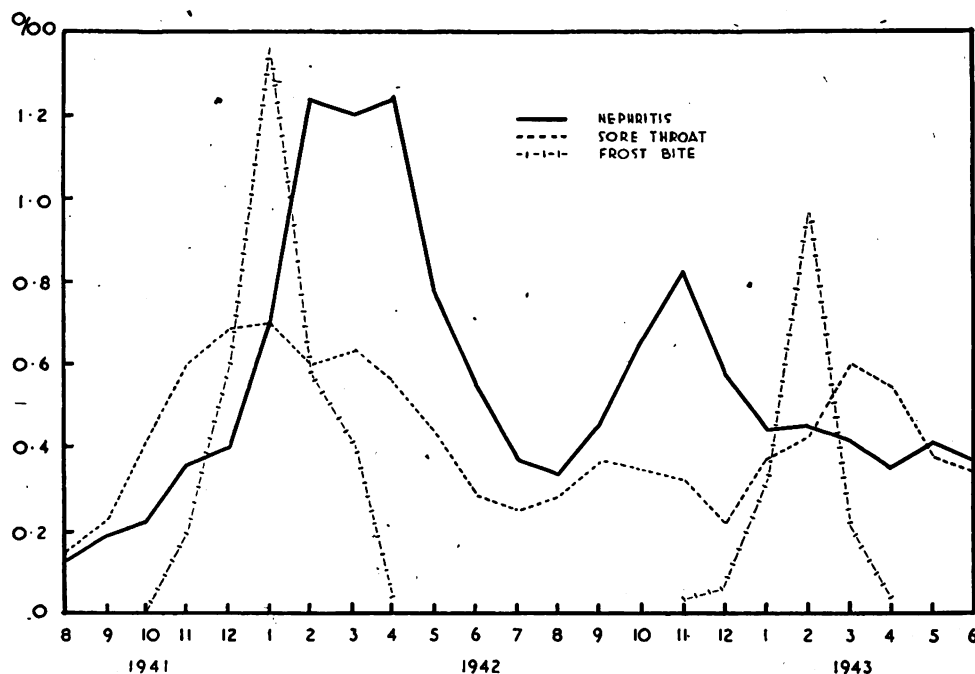


FIG. 2.

Incidence of nephritis, sore throat and frost bite in a German Army on the Eastern Front, 1941-43.

rare amongst civilians, and few cases appear to have occurred except in formations in the line. Of the three factors mentioned, hardship was the most important. It was characteristic that when Divisions were transferred from the west to the east cases only began to occur in large numbers after two or three months of heavy duty in Russia, whereas there was no constant relationship (fig. 2) between the incidence of frost-bite and the incidence of nephritis; and in the Balkans, although the winter of 1943-44 was more severe than the following winter, there were not nearly so many cases of nephritis, a fact which was attributed to the hardships of the arduous retreat from Greece in the second year. There can be no doubt, however, that cold played an important part. One writer [10] lays stress on "cold trauma," and makes the rather naïve statement that when questioned 94 cases in 100 always remember one particularly cold night.

The disease showed no particular age incidence, although the majority of cases in base hospitals appeared to be over the age of 35. This was explained by the statement that the disease was milder, and recovery more rapid, in the earlier age-groups, but the age distribution of the German army may have been responsible. The majority of patients were infantry soldiers, but all arms were represented, depending on the degree of physical hardship to which the individual had been exposed. The disease was uncommon in the Navy and the Air Force, but we saw one case, for example, in a member of the Luftwaffe who had been employed in the line as an infantryman.

Dietary deficiencies seem to have played no special part, and although many cases occurred in association with trench fever (up to 30 per cent on the Eastern Front in 1943) the louse can neither be implicated nor excluded on available evidence; all German soldiers admitted to hospital from the front line were lousy, and in the comparatively rare instances where nurses and orderlies developed nephritis the possibility of louse infestation can hardly be ruled out.

In many cases there appears to have been a transient mild pyrexia about three or four weeks before the onset of typical symptoms, but tonsillitis was not a feature. The vast majority of cases occurred in men who had no history of previous illness of any kind and most authorities agree that focal sepsis was never a factor. Where an acute nephritis was preceded by a sore throat clinicians insisted that these were cases of glomerular nephritis of classical type which must be distinguished from a true field nephritis. Such cases were relatively uncommon; the distinction, they admitted, was difficult at the bedside, but the two conditions differed widely in their epidemiology.

Graphs of the incidence of sore throat and nephritis in various formations offer considerable support to the contention that there is no causal relationship between the two conditions. Fig. 2 shows the incidence of nephritis, sore throat and frost-bite in an army on a southern sector of the Eastern Front from August, 1941, to June, 1943. Similar graphs for divisions transferred from the west to the east showed seasonal peaks of incidence of sore throat, which had no obvious relationship to the occurrence of nephritis, the incidence of which rose sharply in the third month after transfer to Russia whatever the season.

The theory that the condition was due to a specific organism (probably a virus) is widely held amongst German medical authorities. The evidence in favour of this view is as follows:

(a) In Norway, in particular, it was noted that the numerous cases occurred in certain units, while other units at the same time and under similar conditions of weather and duty remained completely free.<sup>1</sup>

(b) Gutzeit [8] states that the curves of incidence of civilian cases and of cases in the army were closely similar, suggesting a seasonal wave of an infectious disease. He also records that he saw a considerable number of cases who developed nephritis while in hospital for wounds, about four weeks after leaving the front line.

(c) Cases occurred amongst medical orderlies, who had not been exposed to cold or wet, employed in hospitals where field nephritis was being treated; we saw one case, and were

<sup>1</sup>Against this it might be argued that a similar observation could have been made in the Apennines last winter in relation to trench foot which nobody believes to be due to infection.

given details of another, in which the patient was a medical orderly in a special kidney centre, and developed the disease while living under good conditions.

(d) Certain storemen of the German Ordnance Corps are stated to have developed nephritis while employed in clothing stores, although they were not exposed to cold and wet.

(e) Clinically and at post-mortem some enlargement of the spleen was always present.

(f) Every third case had an elevated temperature at the beginning of the illness although it is a feature of the disease that it is not preceded by tonsillitis or focal sepsis.

Attempts to prove the infective theory by experiment were unsuccessful. Blood from cases of field nephritis was injected intravenously into healthy individuals without results [4], and efforts to transmit it to experimental animals also failed; but the amount of research carried out on these lines was very small. Rudisser, who quoted Russian doctors as having stated that a few cases had occurred in Russian civilians which they attributed to spread by infected water supplies, believed that the epidemiology of the disease was closely allied to that of infective hepatitis [13]. Others, on the basis of the radiological picture in cases with pulmonary oedema, tried to link it with "virus pneumonia"; the two diseases occurred at the same time in some formations of the German army in Greece.

Allergy was, of course, invoked by some [6]. Others believed the disease to be a complication of pyoderma (Sylla, Korth and Pankow) and claimed to have found identical hæmolytic streptococci and staphylococci in skin lesions and in the urine [4]. (In the last war Wilson found virulent organisms in catheter specimens of urine from fourteen out of a consecutive series of a hundred cases, but regarded them as saprophytes [3].)

#### DISCUSSION.

This paper has been based upon the available literature, which is sadly incomplete in many important details, discussions with German physicians and pathologists who have seen many hundreds of cases, and on clinical examination of the comparatively small number of patients still under treatment in the British zone in Austria. There have been no fresh cases since the middle of May, and it seems probable that the opportunities for first-hand study of field nephritis have now disappeared, perhaps for ever. We have thought it worth while to collect together what evidence we could obtain now, because the loss and destruction of records and data in the final débâcle was so extensive that it seems unlikely that much more of value will ever be forthcoming. Very little biochemical research was carried out at any time, and all clinical records of the cases in the Balkans at the beginning of this year were lost in the retreat of the German army from Jugoslavia.

Most German authorities regard this condition as not, primarily, a disease of the kidneys. To quote Schäfer and Reuter [14]:

"The basic cause of the disease was seen as a general capillitis which led to an increase in permeability. In many cases the capillary damage was limited to the peripheral circulation without the kidneys being involved. The pathogenesis of the dyspnoea must include the question of a pulmonary inefficiency due to the increase of permeability of the lung capillaries as well as the question of cardiac power."

This theory has, of course, been put forward in relation to ordinary acute nephritis. The occurrence of cases of field nephritis without any abnormality in the urine, and of others in which massive oedema has been present long before the presence of albuminuria, and the high protein content of the oedema fluid, may be cited in support of this view.

The suggestion that the disease was due to infection with an unknown but specific organism will naturally be received with scepticism. British experience with the disease in "epidemic" form appears to have been confined to about three hundred Italian prisoners of war who were treated in British hospitals. These cases were indistinguishable, both clinically and pathologically, from ordinary acute nephritis [2]. The question of infectivity could only be settled, however, by making a detailed study of the epidemiology of the condition in the field, and by experiment, and there is insufficient evidence on either aspect to enable one to form an

opinion. It is obvious that if there is a specific organism it must be one which nearly always requires special conditions of hardship and exposure before it can produce the disease in recognizable form.

An analogy might, we suggest, be drawn between "catarrhal jaundice" and infective hepatitis on the one hand and the acute nephritis of civil practice and field nephritis on the other. There seems to be good reason for believing that in each case we are dealing with a disease which assumes a special form under the conditions of active service. Just as the study of infective hepatitis has shown that its peacetime counterpart is due to a specific infection, so it may be worthy of consideration whether field nephritis does not provide a clue to the true nature of acute nephritis.

If it requires a war to produce the disease in epidemic form it is to be hoped that the nature of field nephritis will not be decided in our time; but acute nephritis is always with us.

#### SUMMARY.

(1) In striking contrast with British and American experience in the second World War, the German field army was seriously affected from the opening of the Russian campaign onwards by outbreaks of acute nephritis.

(2) The monthly incidence in the German field force on the Eastern Front rose steadily from less than 0.4 per 1,000 in June, 1941, to over 1.4 per 1,000 in March, 1942. Thereafter it continued to be a serious factor on the Eastern Front, and in 1943 it appeared in the Balkans. Fresh cases have ceased to occur since the termination of hostilities.

(3) The basic syndrome of "field nephritis" consisted of dyspnoea, oedema and albuminuria. The clinical picture was similar to that of trench nephritis in the last war. The case mortality was low and complete clinical cure occurred in about 60 per cent of cases; but there is reason to suspect that the ultimate prognosis may not be so favourable.

(4) Treatment was based on Volhard's hunger and thirst regime.

(5) Histological appearances in kidneys of fatal cases were similar to those in trench nephritis of the last war. Most German authorities believe, however, that the disease is essentially due to a general capillitis and is not primarily a kidney disease.

(6) Cold, damp and hardship were important aetiological factors. Tonsillitis or other preceding infectious conditions seemed to play no part. The evidence in favour of a specific infective agent is discussed.

NOTE.—The graphs were taken from a paper read at a German medical meeting in Austria before the war ended. The author stated that he had taken his figures from articles published by Assman [1], Dietrich [5], and Pilgerstorfer [11] which we have not, unfortunately, been able to consult in the original.

#### REFERENCES.

- [1] ASSMAN (1943). *Klinische Wochenschrift*. (See Note, above.) —
- [2] BOLAND, E. R. Personal Communication.
- [3] BRADFORD, Sir J. R. "Nephritis" Official History of the War (1914–18) Diseases of the War, I, 485. London.
- [4] BÜHLER, F. (1944). "Ätiologie der Feldnephritis," *Medizinische Klinik*, 23/24 June.
- [5] DIETRICH, S. (1943). *Klinische Wochenschrift*. (See Note, above.)
- [6] FRANK (1944). Abst. in *Bulletin of War Medicine*, 5, 144.
- [7] GERSTENBERG, H. W. (1942). *Ibid.*, 3, 519.
- [8] GUTZEIT, K. (1944). "Kriegs-oder Feldnephritis." *Taschenbuch der Ansteckenden Krankheiten des Menschen unter Besonderer Berücksichtigung der Kriegserfahrungen*.
- [9] LAINER, F. (1943). "Die Behandlung und Beurteilung der Kriegs Nephritis," *Wehrmedizin Kriegserfahrungen*, 1939–1943.
- [10] PILGERSTORFER, W. (1943). "Pathogene Klinik und Therapie der Kriegsnephritis," *Ibid.*
- [11] *Idem* (1943). "Die Feldnephritis," *Sammlung Wehrmedizinische Arbeiter*, Vienna.
- [12] *Idem* (1943). Abst. in *Bulletin of War Medicine*, 4, 296.
- [13] RUDISSER, E. (1942). *Ibid.*, 3, 402.
- [14] SCHÄFER, W., and REUTER, A. (1944). "Verlaufsformen der Feldnephritis," *Medizinische Klinik*, 23/24 June.

## *Editorial.*

### PROGRESS AGAINST INFLUENZA

SINCE 1933, when Smith, Andrewes, and Laidlaw discovered that a filtrable virus (influenza virus A) was present in garglings from cases of human influenza, investigators all over the world have been continuously at work, adding greatly to our knowledge of this important disease. Therefore it may be useful to give a short account of some of the more important additions to our knowledge of influenza in the past few years.

*The Viruses.*—In 1940 Francis described a second virus, which was called influenza virus B. Virus A and virus B share many biological characteristics but they are serologically quite distinct and show no cross-immunity. Each virus type is, in fact, a group of strains with antigenic differences between individual members (Gordon, 1942; Magill and Francis, 1936). These minor serological differences are important in diagnosis (Magill and Sugg, 1944) and possibly in immunity.

Two new techniques have greatly helped the diagnosis of human influenza. Burnet (1940) showed that virus could be grown in the extra-embryonic fluids of the amnion and allantois of the developing chick, and virus can sometimes be grown by this method from filtered garglings, thus rendering unnecessary the inoculation of ferrets; by adding penicillin to the garglings, Hirst (1945) rendered filtration unnecessary. This method of amniotic inoculation is perhaps the most sensitive technique we have for recovery of virus, and it is also useful for the large-scale production of a virus relatively free from cells, which is needed for serological work or immunization. The second important technique was Hirst's demonstration that influenza virus caused agglutination of red blood cells, particularly in allantoic-sac cultures. This has broadened the scope of serological diagnosis and made it possible, almost as a standard procedure, to measure the power of immune-serum to prevent red cell agglutination by virus (Hirst, 1942). The Hirst agglutination technique is also useful for the identification and typing of newly isolated strains of virus and for titrating vaccines. Serological diagnosis of influenza is more delicate than methods based on recovery of virus strains from human secretions, but it involves examination of two samples of serum, the first collected during the acute stage of illness and the second during convalescence. Therefore it is more helpful in epidemiological work than in clinical practice.

It has been found that influenza virus strains show biological variations and this knowledge has assisted in our study of human epidemics. Under normal conditions, tissues of the respiratory tract are alone attacked by the virus, but an induced variant of one particular strain of virus A (the W.S. strain) was developed in the laboratory. This variant has the power of attacking the mouse brain (Stuart-Harris, 1939). During adaptation of newly recovered strains to the chick embryo, changes were regularly noted; Burnet and Bull (1943) consider that these may indicate an inherent instability of the human virus. In support of this view, it has been noted that viruses from widespread epidemics are generally more virulent for the ferret than strains from localized outbreaks (Andrewes, 1942). The viruses which we suppose were responsible for earlier pandemics may therefore have been strains with exceptional biological properties which are not active to-day. On the other hand, Shope (1944) believes that the virus of the 1918 pandemic was the same as that now responsible, together with the organism *Hæmophilus influenzae suis*, for swine influenza in the Middle-West of the United States of America. Shope established (1941) that epidemics of swine influenza owed their origin to latent virus that was present in masked form on the lung-worm parasite of the pig's bronchus, and this has led some to postulate an analogous latent virus in man. This has not been demonstrated, but its existence would explain the

almost simultaneous origin of influenza epidemics in widely separated areas and also the mode of survival of virus between epidemics.

*Recent Epidemics.*—Before 1939, both in Britain and America, major outbreaks of influenza caused by virus A broke out at four-yearly intervals with minor outbreaks in intervening years. During the same period in other countries epidemics were irregular. During the war years (1939–1945), epidemics were, if anything, less serious than before 1939, and there was no regular rhythm anywhere. Influenza B was found in two widespread and several localized outbreaks in the U.S.A.; elsewhere it showed itself only in localized outbreaks or sporadic cases either alone or in conjunction with influenza A. In Britain a correlation has become evident between the activity of the viruses and the number of deaths notified as due to influenza. The importance of this group of viruses in relation to acute pulmonary disease of a fatal character is established.

In widespread outbreaks at least 80 per cent of clinical cases can be classified by serological means, and there are many subclinical infections which can be recognized and classified in the same way. Even in such outbreaks less than 50 per cent and rarely more than 25 per cent of the population at risk show evidence of infection. It is unknown why the remaining 75 per cent escape; this cannot be entirely explained by the level of neutralizing antibodies in their serum though this is often lower before the epidemic in those who contract infection than in those who escape. A varying proportion of cases of influenza fail to yield evidence of infection by either virus A or B. Although these cases are clinically indistinguishable from typical influenza it has been noted that they are usually found in localized or mixed outbreaks. There is some controversy about the interpretation of these cases, which are often termed influenza Y (Rickard *et al.*, 1941). They may be caused by other as yet unknown viruses or they may be examples of infection by virus A or B in which, for some reason, the usual serological response is lacking. There are no exact clinical grounds for separation of influenza Y from influenza A or influenza B and these in turn cannot be distinguished clinically from each other with any degree of certainty. There is some certainty about the clinical differentiation of influenza from primary atypical pneumonia of unknown aetiology; but this disease itself, which has been relatively common in the past few years (Commission on Respiratory Diseases, U.S. Army, 1944), emphasizes what a variety of virus infections may involve the respiratory tract. As with the common cold, further definition of primary atypical pneumonia and its certain differentiation from influenza awaits exact knowledge of the viruses concerned.

*Prophylaxis.*—Two types of influenza virus vaccine are under experimental trial. The first—a live, attenuated, egg-culture virus, which is used intranasally (Burnet, 1943)—has yet to be given a field trial. The second—an inactivated virus given subcutaneously—has already given results under field conditions which are the best reported so far (Commission on Influenza of the U.S. Army, 1944). Trials of earlier vaccines met many difficulties and this latest success may be attributed to the use of a purer and more concentrated vaccine and to good fortune in the timing of immunization, which was completed within two to four weeks of the epidemic and thus exerted its maximum effect at the crucial time. The use of still purer vaccines (Stanley, 1943) or chemical adjuvants (Friedewald, 1944) may so prolong the period of antibody production that there will no longer be the same need to inoculate with vaccine immediately before an epidemic; large-scale immunization will then become a much more practicable measure. For the present, our policy must be to hold as big a stock of this vaccine as we can lay our hands on, and to be prepared to get it quickly into use on the first evidence that an epidemic is either imminent or in its early stages. Warning signs of this are: steadily rising rates of respiratory infection proved by laboratory methods to be caused by influenza virus and the appearance of cases of rapidly fatal influenza in healthy young adults with the characteristic post-mortem appearances in the lungs. The effect of the vaccine on disease rates becomes evident about one week after inoculation; it is not known how long protection remains. Control of epidemics by aerial disinfection is not yet a feasible measure though experiments to this end are being actively pursued (Andrewes, 1940; Mudd, 1944).

## REFERENCES.

- ANDREWES, C. H. (1940). *Lancet*, **2**, 770.  
*Idem* (1942). *Proc. Roy. Soc. Med.*, **36**, 1.  
BURNET, F. M. (1940). *Brit. J. Exp. Path.*, **21**, 147.  
*Idem* (1943). *Med. J. Aust.*, **1**, 385.  
BURNET, F. M., and BULL, D. R. (1943). *Aust. J. Exp. Biol. and Med. Sci.*, **21**, 55.  
Commission on Respiratory Diseases, U.S. Army (1944). *Amer. J. Publ. Hlth.*, **34**, 335, 347.  
Commission on Influenza, U.S. Army (1944). *J. Amer. Med. Assn.*, **124**, 982.  
FRANCIS, T. (1940). *Science*, **92**, 405.  
FRANCIS, T., SALK, J. E., PEARSON, H. E., and BROWN, P. N. (1944). *Proc. Soc. Exp. Biol. N.Y.*, **55**, 104.  
FRIEDEWALD, W. F. (1944). *J. Exp. Med.*, **80**, 477.  
GORDON, I. (1942). *J. Immunol.*, **44**, 231.  
HIRST, G. K. (1942). *J. Exp. Med.*, **75**, 49.  
*Idem* (1945). *Proc. Soc. Exp. Biol. N.Y.*, **58**, 155.  
MAGILL, T. P., and FRANCIS, T. (1936). *Ibid.*, **35**, 463.  
MAGILL, T. P., and SUGG, J. Y. (1944). *J. Exp. Med.*, **80**, 1.  
MUDD, S. (1944). *Brit. Med. J.*, **2**, 67.  
RICKARD, E. R., HORSFALL, F. L., HIRST, G. K., and LENNETTE, E. H. (1941). *Publ. Hlth. Rep. (Wash.)*, **56**, 1819.  
SHOPE, R. E. (1941). *J. Exp. Med.*, **74**, 41 and 49.  
*Idem* (1944). *Medicine*, **23**, 415.  
SMITH, W., ANDREWES, C. H., and LAIDLAW, P. P. (1933). *Lancet*, **2**, 66.  
STANLEY, W. M. (1943). *J. Exp. Med.*, **81**, 193.  
STUART-HARRIS, C. H. (1939). *Lancet*, **1**, 497.
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## *Clinical and Other Notes.*

### WHEN IS A CUP CLEAN ?

PEOPLE have definite and decided views on standards of cleanliness for crockery and glassware. Common decency demands the removal of saliva and lipstick from cups, but there are not many faddists who imitate the male patron at a busy cafeteria, who was seen to "dip a paper napkin in his coffee, then use it to wash the rim of his cup, his knife, fork, and spoon and, finally, dry them carefully with the dry portion of the napkin" before he felt "safe to go ahead and eat" [1].

Cracks in cups appear to be a happy breeding ground for bacteria [2] ; in the examination of twenty cracked cups a variety of organisms was isolated : staphylococci from 13, hæmolytic streptococci from 9, non-hæmolytic streptococci from 10, and Gram-negative bacilli from 7. To some, these findings indicated a risk of infection from the use of cracked pottery but many feel that the dangers have been exaggerated [3].

Methods of examining feeding utensils are so varied [1, 4, 5, 6] and in such an early stage of development that acceptable bacteriological standards are difficult to define. It is clear that many types of dishwashing machines are either inefficient or inexpertly used [7] ; others, correctly used, can produce clean and hygienic crockery. American investigations confirm a common-sense expectation : good washing and rinsing do more than disinfectants to reduce the number of bacteria on crockery. If a greasy film covers a plate or glass, chlorine is ineffective ; if all the film is removed it is likely that all the bacteria have also been removed [1].

Clean cups and glasses are the concern of the military hygienist. Mess tins are fairly easily sterilized in hot water, but cups and plates in canteens and messes are not so easily purified. An investigation of the washing-up arrangements in 33 messes in one camp [8] showed that plates were left in the rinse-water for varying periods and at different temperatures : 43° C. for one minute, 80° C. for two minutes, 68° C. for three minutes, and 63° C. for five minutes. Cases of diarrhoea or gastro-enteritis several times appeared within from one to three days of contamination of rinse-water by coliform organisms. Where washing was done by hand the water was never above 45° C. and because three minutes at 65° C. were required to kill intestinal organisms it was suggested that plates should always be packed in trays for immersion.

In dishwashing technique stress must be placed on really hot water which, without any chemical addition or mechanical aid, will remove grease and reduce the bacterial flora. There is no direct evidence that epidemic disease has in fact been spread by eating-utensils or drinking-vessels but a high standard of cleanliness is a most desirable aim on both æsthetic and bacteriological grounds. Indeed, cook-house supervision is an important part of management and the inescapable duty of those in charge of messing arrangements.

### REFERENCES.

- [1] *New York State J. Med.*, 1942, 42, 1,000.
- [2] *Lancet*, 1945, February, 24, 259.
- [3] *Ibid.*, 1945, March 31, 415.
- [4] *Publ. Hlth. Rep., Wash.*, 1942, 57, 33.
- [5] *Amer. J. publ. Hlth.*, 1943, 33, 1,054.
- [6] *Amer. J. Hyg.*, 1942, 36, 316.
- [7] *Amer. J. publ. Hlth.*, 1943, 33, 722.
- [8] *Military Surgeon*, 1943, 92, 276.

## RAT-BITE FEVER.

As a descriptive term, "rat-bite fever" leaves something to be desired. The rat is not the only animal whose bite may cause the disease; bites from cats and ferrets have also been incriminated. Moreover, there are two types of rat-bite fever caused by different organisms: *Spirillum minus* and *Streptobacillus (Haverhillia) moniliformis*. Nevertheless the term is accepted usage, and, since both types of organism are penicillin-sensitive [1], this may help to maintain its usefulness in clinical practice. In Japan, rat-bite fever caused by *Spirillum minus* seems to be relatively common, perhaps because Japanese workers searched for cases more energetically than others.

**Symptoms and Signs.**—Usually in about ten to fourteen days (sometimes up to nine weeks) after the bite there is an abrupt attack of shivering, malaise, and high fever; during the incubation period, the local injury may have healed, but with the onset of symptoms it often becomes inflamed and tender with swelling of the related lymph glands.

In a day or two, fever and other symptoms subside but in another three to ten days the remission is followed by a relapse. Purplish maculo-papular rashes are common, muscle-aches and joint-pains are often marked, the Wassermann is positive in about half the cases, and the spleen may become palpable. In the absence of treatment repeated relapses will continue for months or even years. In the type caused by *Streptobacillus moniliformis*, there may be polyarthritis and the skin eruption is like erythema multiforme. If the disease is prolonged, the intervals between bouts of fever may become gradually shorter.

**Diagnosis.**—The diagnosis is not likely to be missed if the possibility of rat-bite fever is considered. Malaria and relapsing fever are excluded by repeated direct examination of stained blood films.

To confirm the diagnosis of rat-bite fever a blood culture should be made on Loeffler slopes and 50 per cent serum-broth during a pyrexial period; 3 to 5 c.c. of blood should also be inoculated intraperitoneally into a suitable animal—guinea-pig, white rat, or mouse. Material aspirated from an enlarged gland may also be used. In about seven to fourteen days after inoculation *Spirillum minus* may be demonstrated in films made from the blood or peritoneal exudate of the mouse. Dark-ground examination of the patient's blood will seldom reveal spirilla but will often mislead the inexperienced if they are not aware that various artefacts are readily mistaken for spiral organisms. *Streptobacillus moniliformis* will grow in blood culture in a medium with plenty of serum at 37° C.; in mice it gives rise to a general infection—often rapidly fatal—with localized lesions in bones and joints.

Bites from cats, rabbits, and dogs occasionally give rise to infection with *Pasteurella septica*. Acute swelling and pain quickly follow the bite, and the lesion then becomes indolent, often with necrosis of underlying bone and formation of abscesses [2]. Confusion with the typical rat-bite fever is not likely to persist beyond the acute stage at the onset; the diagnosis is confirmed by culture and the treatment is surgical.

**Treatment.**—Penicillin is the drug of choice. It should be given in the usual way: 10 to 15,000 units intramuscularly every three hours for five to seven days. The experimental evidence so far available suggests that this will cure both types of rat-bite fever; one human case of *Streptobacillus moniliformis* infection responded quickly to only two days' treatment [3]. Before penicillin was available, a few injections of neo-arsphenamine intravenously usually cured most *Spirillum minus* infections although relapses were not rare after this treatment. It was not effective against *Streptobacillus moniliformis*.

## REFERENCES.

- [1] *Proc. Mayo Clin.*, 1944, 19, 257.
- [2] *Lancet*, 1945, June 16, 753.
- [3] *Ibid.*, 1944, October 21, 548.

## DENGUE AND PERVERTED TASTE.

QUALITATIVE alterations in taste during the course of dengue appear to have escaped the notice of most physicians or they have not been thought worthy of record. Dengue is sometimes difficult to differentiate from sandfly fever but in areas where the sandfly is absent and *Aedes ægypti* present the diagnosis can be made with some certainty. It was under these conditions that alterations in taste were studied in New Guinea [1]. Leading questions were avoided and "after the symptoms were obtained the patient was casually asked if he had any odd or funny taste in his mouth. Most often the response was definite, e.g. 'It tastes bitter, like atabrine . . .'" which left no doubt as to its existence." Apparently the taste alteration was most noticeable on taking food or drink so that tea and whisky became repulsive. Changes in taste were classified under four headings: bitter, sour, sweet, and miscellaneous; of these, the first was the commonest. 86 per cent of dengue patients had a perverted taste during the course of their illness and in the majority it was noticed on the first or second day; usually it lasted for three or four days. All troops were receiving suppressive anti-malaria therapy and although alterations in taste had not been noticed it was important to find out if the disturbance of taste occurred apart from dengue. Among 76 men suffering from malaria only 22 (29 per cent) admitted taste symptoms.

Perversion of taste is not peculiar to dengue but from the evidence presented it appears to be common in this infection; further observations on its frequency in this and other diseases are obviously desirable and, if controlled, would make a useful contribution to medical knowledge.

[A PERSONAL NOTE.—This is very true. My wife had dengue and nearly alienated for ever two friends, who brought her coffee, tea and lemon barley water, by her reference to "filthy muck." This characteristic symptom had not then been recognized. It should be known by all who may have to nurse such cases. It is similar to the effect produced by eusol gargles which must have been invented by someone with an abhorrence of tobacco and alcohol. I have had some!—EDITOR.]

## REFERENCE.

- [1] *War Medicine*, 1944, December, 392.

## SPRUE.

In most conditions satisfactory methods of treatment are worked out after the cause of the disease is known but sprue is one of the few diseases of unknown origin for which a cure can be effected. It is necessary to stress the fact that cure is the usual outcome of this disease because the patient, after a long period in hospital, develops the mental outlook of a chronic invalid and is apt to give up all hope of returning to a normal life and, in particular, to a normal diet. Great help can be given to the patient by reassuring him about the future and if this is done with confidence the period of invalidism will be shortened.

For some time patients suffering from sprue have been arriving in this country; they have been well handled in India and it is up to doctors in this country to continue the work so well started. Apart from reassuring the patient it is of importance that he should not be retained too long in hospital; when the faecal fat and the blood picture have returned to normal the patient is ready to be discharged to a convalescent depot. There, graduated exercise and other forms of reablement should soon restore him to a state in which he is fit to return to duty. By a speedy return to a normal environment the patient becomes once more a useful member of the community and derives enormous benefit from the knowledge that he is again able to take his place among his fellows.

## Notices.

### ARMY MEDICAL DEPARTMENT BULLETIN.

*A.M.D. Bulletin* Nos. 50 and 51 (August and September, 1945) and Supplement No. 24 (August, 1945) have now been published by the War Office. Distribution scale : one copy to every Medical and Dental Officer.

#### SUMMARY OF CONTENTS.

*Article No.* *No. 50—August, 1945.*

- 375. *Different Outlooks on Research.*—Research means different things to different people. Prominence is given to Professor Mervyn Gordon's statement of 25 years ago : " The object of research is the advancement, not of the investigator but of knowledge " and to the late Professor Topley's view : " We are wonderfully lucky people to be allowed to spend all our lives playing in a laboratory."
- 376. *Hepatic Amœbiasis.*—Symptoms and signs of hepatic amœbiasis are often vague and equivocal but grim results arise from failure to suspect this condition during its early and curable stage.
- 377. *Penicillin for General Practice?*—At the moment, penicillin is administered by methods that tend to confine its use to hospital. But work now in progress may result in preparations better suited to general practice.
- 378. *Decubitus and Calculus Formation.*—Patients who lie flat on the back for prolonged periods may develop renal stone. Seven steps are described that will help to prevent this complication.
- 379. *Admission to St. Dunstan's.*—Soldiers blinded as a result of war service are eligible for full membership of St. Dunstan's with numerous advantages to their training, outlook, and future prospects.

*Supplement No. 24. Abdominal Wounds.*—This extension to chapter 20 of the *Field Surgery Pocket Book* emphasizes new lessons taught by campaigns since 1943 and re-emphasizes old teachings—above all on the importance of post-operative care.

#### *No. 51—September, 1945.*

*Article No.* *(Final Issue.)*

- 380. *Our Final Issue.*—*A.M.D. Bulletin* was first published in April, 1941, with the object of keeping alive and keen a sense of professional unity and interest among Army Medical Officers. It has attempted to do this by publishing reliable and readable up-to-date comments on medical affairs. Such comments can always be read in the leader columns of ordinary professional journals, which, with the end of the war, will again be easily and regularly obtainable.
- 381. *Treatment of Amœbic Dysentery.*—Treatment should begin as soon as possible after the diagnosis has been made and the patient has been got under suitable conditions. Three courses are described in detail, each suitable for a different stage of the disease.
- 382. *Treatment of Hepatic Amœbiasis.*—Specific details are given of the medical or surgical measures appropriate to different stages of the disease.
- 383. *Stiff Fingers from Improper Splintage.*—Stiffness of the metacarpo-phalangeal joints from faulty splinting is too often a complication of radial nerve paralysis. Many splints have been devised to ensure that fingers remain freely movable ; a recent example that meets all needs and can be simply improvised is described and illustrated.

384. *Is Your Spleen Really Necessary?*—A man without a spleen need not be excluded from medical category "A" if he is otherwise eligible. Recent experience and experiments have confirmed that strenuous military service even in the tropics is compatible with the absence of a spleen.
385. *Battlefield Inquest.*—Of those who died on the battlefield, how many could have been saved if they had received the same injuries right on the doorstep of a fully equipped surgical centre? Very few, according to evidence from autopsies carried out in the forward area on bodies brought from the field. Among 33 cases, hæmorrhage was the essential factor causing death in 14 and it was second in importance in 6 others.

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### LORD MAYOR TRELOAR CRIPPLES' HOSPITAL AND COLLEGE.

ALTON AND HAYLING ISLAND, HANTS (400 BEDS).

APPLICATIONS are invited for the post of resident MEDICAL SUPERINTENDENT of the above Hospital. Candidates should be under the age of 45 and must have senior surgical qualifications and experience in orthopædic work. Salary £1,500 to £2,000 according to experience. House, lighting and fuel provided.

Applications together with testimonials and full particulars of professional experience should reach the Secretary on or before December 31, 1945.

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### THE DEVELOPMENT OF INHALATION ANÆSTHESIA 1846 TO 1900.

THE Wellcome Historical Medical Museum has arranged to publish, in conjunction with the Oxford University Press, an important work on *The Development of Inhalation Anæsthesia* from 1846 to 1900, by Dr. Barbara M. Duncum, of the Nuffield Department of Anæsthetics, University of Oxford, and formerly on the staff of the Wellcome Historical Medical Museum.

The work is to be the first of the Museum's post-war series of Research Studies in the History of Medicine. It deals exhaustively with the history of inhalation anæsthesia in England, the United States of America and on the European Continent, from the scientific and clinical points of view, and shows, as well, the influence of general current events upon this branch of surgery. Most important features of the work are its investigation of the various changes of opinion in regard to the physiological action of anæsthetics, the evolution and practical application of inhalers and other apparatus and the introduction and adoption of anæsthetic drugs during the period under review. The work is illustrated by over 160 photographs and drawings, should prove of especial interest to the student of medical history and, since it shows how modern anæsthetic methods have grown from nineteenth century beginnings, should be of great practical value to anæsthetists and research workers in anæsthetics.





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Authors are alone responsible for the statements  
made and the opinions expressed in their papers.

**Journal**  
of the  
**Royal Army Medical Corps.**

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TO ALL RANKS OF THE ARMY MEDICAL SERVICES.

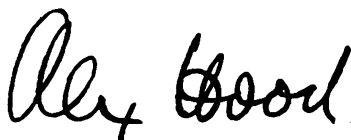
" IN ARDUIS FIDELIS "

1939—1945.

THE War is over. Victory is ours. Peace is with us. The road has been long and hard and it has required a very great effort to reach our goal. The Army Medical Services throughout the world have had a tremendous task to ensure that everything we could contribute to the victory of our arms was available in full measure.

You can, each one of you, in every rank and in all branches of the Medical Services, look back with the lasting satisfaction that belongs to those who have been participants in a noble task well and truly sustained.

Never in the history of any Army in any war has the soldier been more securely guarded against disease, never have the sick been better cared for and never have the wounded had more expeditious succour or a better chance not merely of survival but of complete recovery. That is something which we who were part of this Service can cherish in our memories down the years to come for " although the pride and pomp of war may belong exclusively to the warriors, yet in all mankind to follow the line of duty through difficulty and danger with undeviating rectitude is true glory."



D.G., A.M.S.



## *Original Communications.*

### SCARLET AND GREY.



FLORENCE NIGHTINGALE.

POSSIBLY the earliest organized Military Nursing was done by the Knights of St. John to whose Order Ladies were added about the year A.D. 1200. It is recorded that the new Sisterhood rivalled in zeal the most active of the Brethren.

The Eternal Feminine does not seem to have altered much with the passing of more than seven centuries.

During the years between the Crusades and the Crimea, nursing in the Field seems to have been left largely to the tender mercies of the female camp followers or the compassion of friendly disposed local inhabitants.

Speaking of the Crimea Campaign it is recorded that "Miss Florence Nightingale and her staff of nurses served in the Crimea from 1854 to 1856." The story of Florence Nightingale is too well known to need recapitulation here. She lived to see Military Nursing firmly established and well organized.

It is known that nurses were employed at Fort Pitt, Chatham, and later at Netley, but it was not until February 3, 1866, that a Royal Warrant made provision for the appointment of female nurses to any Military *General* Hospital. During the wars in South Africa and Egypt after 1878 the staff of female nurses was; from time to time, augmented for service in those countries.

In 1881 the "Army Nursing Service" was inaugurated and a Code of Regulations for the "Female Nursing Service" was published in 1884.

In 1897 there came into being the Army Nursing Service Reserve "due entirely to the indefatigable labours and untiring energy of Her Royal Highness the Princess Christian."

Queen Alexandra's Imperial Military Nursing Service was established by a Royal Warrant dated March 27, 1902. At the first meeting of the Nursing Board, Monday, April 21, 1902, there were present: *The Vice-President*, The Countess Roberts; *Chairman*, Surgeon-General W. Taylor, C.B., Director-General, A.M.S.; *Members*, Surgeon-General A. H. Keogh, C.B., Sir Frederick Treves, K.C.V.O., C.B., Miss S. J. Browne, Matron-in-Chief, Miss Gordon, Matron of St. Thomas's Hospital, Miss Marks, Matron of King's College Hospital, Viscountess Downe and the Hon. Sidney Holland.

The second meeting was attended by the President, Her Majesty Queen Alexandra, who "wished the Board every success and desired that all its proceedings should be carefully reported to her in full; and, further, signified her intention to give badges to all members of her Nursing Service."

Her Majesty remained President until her death in November, 1925. She was succeeded by Her Majesty Queen Mary whose interest in all matters connected with the Nursing Service remains unflagging. The Service owes much to her wise councils.

The Countess Roberts was Vice-President until 1917; her daughter, Countess Roberts, was appointed a member in 1917 and Vice-President in 1934, when she was succeeded by Lady Isabel Gaythorne-Hardy who was followed by Lady Myra Lloyd in May, 1944. The Dowager Countess Airlie was Vice-President from 1917 to 1934.

In October, 1908, the Queen Alexandra's Imperial Military Nursing Service Reserve was formed, replacing the Army Nursing Reserve. This year also saw the advent of the Territorial Army Nursing Service.

A separate Military Families' Nursing Service was founded in 1921 but this rather anomalous position terminated with its amalgamation with the Q.A.I.M.N.S. in July, 1926.

An important change came when the Indian Service also amalgamated in November, 1926, a separate Military Nursing Service being formed to nurse Indian soldiers. From this time onwards the Q.A.I.M.N.S. have served in India as well as in other stations overseas.

The familiar "Red Cape" was worn by the Q.A.I.M.N.S. and the Indian Service before their amalgamation, while the "Reserves" and the "T.A." have worn a grey cape with a scarlet border. The latter two have also distinctive badges.

A notable change in the status of the Nursing Service came in May, 1941, with the granting of Commissioned rank. This was followed by the introduction of the Khaki Field Service Dress for outdoor wear. The Scarlet and Grey Lanyard is the most obvious distinction from women Officers of the A.T.S. Whatever our feelings as to this change may be, it has come to stay and has not interfered one whit with nursing efficiency.

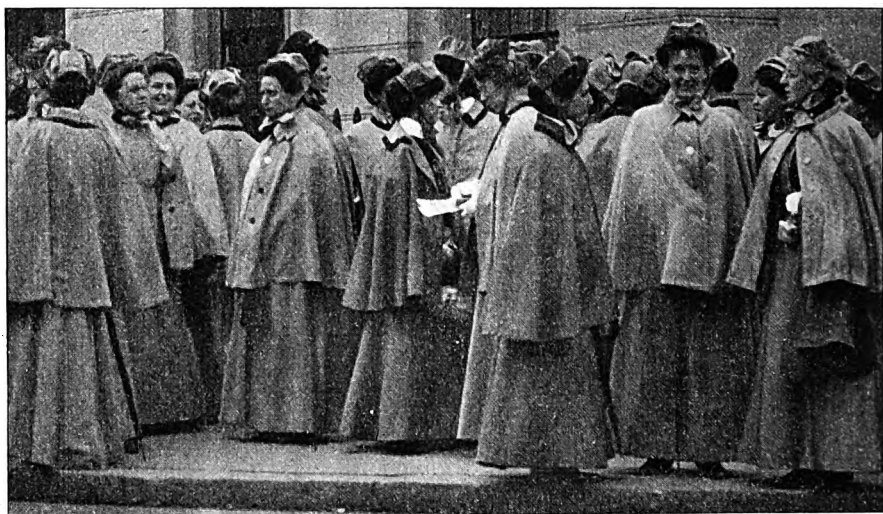
In the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS of May, 1943, there is printed a tribute to the "Army Sisters" which originally appeared in *The Spectator*, February 12, 1943. It is not too much to say that the spirit of selfless devotion that shone in the souls of Florence Nightingale and "her staff of Nurses" still shines, ever bright, in the souls of the nurses of to-day. That spirit has only been increased by the wide-flung scope of the present war and its manifold developments. Our Army nurses have serenely faced all trials, difficulties and dangers whether in tropical jungles, the sands of the Western Desert, the Anzio Beach-head or the mud of Flanders.

Many have laid down their lives; some have suffered immeasurably at the hands of the Japanese. To many of us it has been given to be with them in moments of peril and danger.

Whether facing the cold waters of the Atlantic after a torpedo attack, the acute moments of air attack or shell fire, their one thought has always been "my patients."

Although the Sisters in the more forward medical units may, from time to time, appear in battledress, the policy has always been to have them in nursing uniform as soon as possible. It is unnecessary to stress the effect this has on the morale of their patients. How they manage their laundry must remain one of the major mysteries of the war.

It is all too seldom that in medical or surgical case reports we find the physician or the surgeon making any reference to the nursing aspect of the treatment or of the great part this plays in the progress of the patient. It was once suggested that the introduction of the sulpha drugs and penicillin has made much surgery unnecessary. Be that as it may, nothing yet



#### LOOK ON THIS PICTURE

A group of members of Queen Alexandra's Imperial Military Nursing Service taken in the year 1902.

introduced has rendered nursing unnecessary or in any way made the calls on the skill and devotion of the Nursing Services any less insistent. It is admitted that, for example, preventive inoculation has abolished the vast number of enteric cases once met with and that no longer do we see wards full of chronic septic cases but, broadly speaking, the need for skilled nursing remains as urgent as ever.

Indeed, the introduction of penicillin has added to the labours of nursing. Has sulpha-thiazole made the nursing of pneumonia patients superfluous? These things may ease the burden for both patient and nurse but nursing skill is still required.

Does anyone think that the establishment of Special Surgical Units has lessened the burden on the nurses? If so, let them visit a hospital specializing in the treatment of fractured femurs.

In any case of serious illness or of surgical emergency nursing is of paramount importance and those of us who have been patients are left in no doubt whatever as to the great debt of gratitude we owe to our nurses. Their standard of efficiency has never been higher than it is to-day.

The modern "Lady of the Lamp" is, as often as not, a slim, alert, clear-eyed young woman with an electric torch in the pocket of her battle-dress trousers. She is an expert at blood transfusion and knows all about penicillin and has technical qualifications not dreamed about in the days of the Crimea. But she has the same spirit of devoted service as had the "Lady of the Lamp" in the wards at Scutari.

Let us never forget what we, as doctors, owe to our nurses. Our patients do not forget.



#### AND ON THIS

The first women nurses to reach Benghazi after its occupation. They came, not in grey and scarlet, but in khaki slacks, shirts and battle blouses.

*"Plus ça change, plus c'est la même chose."*

## UNDER NEW MANAGEMENT.

THE morning of January 15, 1944, dawned cold and bleak over the Southern counties of England. An almost impenetrable pall of dank cold mist blanketed the countryside as sundry cars cautiously groped their way towards Netley. Then—with dramatic suddenness—the sun burst through and, half an hour before the ceremony was due to begin, Southampton Water enjoyed typical “Netley weather,” with the bright sunshine so many of us associate with Sports Days in years long past.

Exactly at 11.30 a large black Buick, embellished appropriately enough with the American General's silver star, glided through the main gate and drew up at the foot of the main Avenue, almost on the historic spot where, eighty-eight years ago, Queen Victoria had stepped ashore to lay the foundation stone of what the *Illustrated London News* of the period described as “a magnificent pile of immense proportions.” On alighting, the Director-General and the Chief Surgeon were greeted by Colonel Atkins (A.D.M.S., Hants and Dorset District), Colonel Thomas and Lieut.-Col. Andreassen (Southern Base Section) and Lieut.-Col. Figuras (Commanding 28 U.S.A. General Hospital).

The party proceeded up the Avenue, this time devoid of the historic red carpet of inordinate length, which was so prominent a feature of the Stone-Laying Ceremony. On arriving at the head of the Avenue, they were confronted with two exceedingly smart Guards of Honour, flanking the main entrance—a British R.A.M.C. Guard, supported by the Band of the Hampshire Regimental Depot, and an American Guard, supported by the Band of one of the fighting formations of the United States Army. The Union Jack and the Stars and Stripes flew on either side of the entrance.

As the Inspecting Generals reached the Saluting Point, the officer in command of the Parade, Colonel P. Kidd (Commanding the Royal Victoria Hospital) called the two Guards to attention as the bands crashed out the General Salute.

An inspection of the Guards followed, during which the respective bands discoursed appropriate music. Both Generals carried out a careful inspection, exchanging here and there an intimate word with some of the soldiers on parade. At the end of the inspection, the Inspecting Generals, with other officers, took up their stand on the stairs of the main entrance and General Hood delivered the following address:—

‘GENERAL HAWLEY,

It is my duty to-day to hand over the Royal Victoria Hospital to the keeping of the Medical Services of the United States of America.

This historic hospital, the first and largest permanent Military Hospital in the Empire, was erected by the express command of Her Majesty Queen Victoria, and was completed in the year 1863.

From that date until to-day the hospital has received sick and wounded from every theatre of war in which our armies have been engaged. During the whole of this period, broken men from all parts of the Empire have looked with renewed hope upon this building as their ship has sailed up the sparkling waters of Southampton Water.

It was here that Florence Nightingale's glorious Crimean experiment fructified in the magnificent Nursing Service which serves the Army to-day.

Within these precincts the Royal Army Medical Corps had its birth and for many years, under the inspiration of great names such as Leishman, it was the home of research and investigation in military medicine and hygiene. This work of research and of training of generations of all ranks in the Medical Services has gone on without interruption up to this day.

The last convoy arrived from the battlefields of Italy two weeks ago. Let us remember that their fathers, their grandfathers and their great-grandfathers before them were wheeled along these self-same corridors having come from the battlefields of the world in the last World War, and before them from Magers-

fontein and Colenso and Majuba, Tel-el-Kebir, Khartoum and Omdurman, from China, Chitral and all our Frontier Wars and so right back to the days following the Crimea.

This morning's ceremony does not constitute any break in the story: it is merely the opening of a new chapter. The fact that our two Medical Services recognize no distinction of nationality has already been abundantly proved in Africa, in Sicily and Italy as well as in this country.

We have the same ideals and the same aspirations and I hand over this key in the certain confidence that when, in the hour of Victory, the time comes for our return, the great traditions of the Royal Victoria Hospital will have gained an added lustre from the skill and devotion shown by our Comrades in the United States Medical Services during the period of their occupancy.



[With acknowledgment to *Southern Daily Echo*; Southampton.

Lieutenant-General Sir Alexander Hood presenting the key of the Royal Victoria Hospital to Brigadier-General P. Hawley, January 15, 1944.

General Hawley, Chief Surgeon, E.T.O.U.S.A., then replied in the following terms:—

‘GENERAL HOOD,

I accept the Royal Victoria Hospital which you have so generously placed at the disposal of our Service; and, with it, I assume the obligation of maintaining its great traditions during the time that it is in our charge. I hope that the time will soon come when I can restore it to you.

Your people and my people are united in this great struggle against the forces of evil that would destroy human liberty. It is a curious coincidence that, at the very moment the doors of this hospital were first opened, my own people were locked in a bloody struggle among themselves—a struggle which was to determine two things: first, that my people were to remain united; and, second, that no human being would ever again be enslaved within their borders.

Having first applied those principles to ourselves, we now find ourselves, as a united people, joined with the other great democracies of the World in a battle against those who would destroy the things that have always been more precious than life to your people and my people.

How little did Her Majesty realize, when she dedicated this hospital, that the events then transpiring across the Atlantic were to exert a profound influence upon her Empire. And how little did she realize that this hospital, upon which she had graciously bestowed her name, would one day become a symbol of the common purpose and close friendship of these two great peoples. No finer symbol of our association together can be found than this hospital. It is to the Royal Army Medical Corps what his home is to a man. And, in offering us the Royal Victoria Hospital, the Royal Army Medical Corps has offered one of its real treasures.

We understand this, and we appreciate it more than I can tell you.'

We shall cherish it and care for it. And we shall return it to you unharmed.

Thank you.

After the bands had played the National Anthems of both nations, General Hawley led the way into the main hall of the hospital.

The presentation key was no ornate affair of gold and enamel, but it will be valued no less because it was made for us by our comrades of the Royal Engineers in their own workshops. It bore the monogram of the Royal Victoria Hospital and the well-known star of the American Army. It was borne on a cushion made by the V.A.D. i/c Needlework at the Educational Therapy Centre, decorated with the badges of the R.A.M.C. and the U.S. Medical Corps, and was handed over to our Director-General by the Registrar of the Hospital, Major G. W. Sellex, M.C., who can claim forty-eight years' continuous service in the Corps to his credit.

In the main hall, the Visitors' Book was signed by the Senior Officers of the Medical and Nursing Services.

Within the Hall were arranged various documents and other items of historical interest. Prominent among these was, of course, Queen Victoria's celebrated shawl; there were also photographs of the original Stone-Laying Ceremony and the original diagrams showing the details of the royal progress thereto, trophies won by No. 4 Company in recent years and the American flag presented to 58th U.S.A. General Hospital by the inhabitants of Pittsburgh on their departure for the European Theatre.

Colonel Kidd arranged for a number of capable guides to be in attendance, who took the guests under their wing and showed them the many places of scientific and historical interest in the hospital.

The Director-General and Chief Surgeon visited the Church, Cinema, Fracture Ward, Resuscitation Ward, Hospital Kitchen, the Y.W. and Y.M.C.A. (where a signed photograph of His Majesty recently presented by the Princess Royal was displayed). The Library proved of special interest and it was not easy to detach many American Officers absorbed in its many attractions in time to rendezvous in the Ante-Room at 12.45. Here flagging energies were duly revived until the well-known strains of the Roast Beef of Old England summoned us to the dining room.

The Netley Mess lived well up to its reputation by providing a lunch of so excellent a character that one was apt to overlook the fact that it was of strictly wartime proportions. In a word, the Mess Steward, Mr. Harwood and his band of loyal helpers led by Mr. Jewell, really excelled themselves. Major Crawford and Major O'Donovan occupied the positions of President and Vice-President and the loyal toasts were drunk to the King and the President of the United States, the National Anthems being played by the band of the Hampshire Regimental Depot, which had also provided a most attractive musical programme during the luncheon.

The Director-General then gave us one of his post-prandial speeches in his happiest vein. He recalled many historic incidents in the history of the hospital and told us of its traditions



(some of which must surely be apocryphal !) and many of us learned for the first time that our American comrades would be expected to carry out the age-long custom under which the C.O., the Registrar, the Serjeant-Major and the Matron plunged from the end of the pier daily before breakfast both in winter and summer.

General Hawley followed in equally good form and few of us will forget the twinkle in his eye when, during an acknowledgment of the debt owed by his Medical Service to our own, he told us that in the very early days of the American Army they adopted many of our Medical Army Forms which were in use to this day with minor modifications. They had, for example, deemed it advisable to amend a column in which his countrymen admitted to hospital appeared under the general heading of "rebels."

After lunch, the Director-General found time to have a talk with twelve civilian employees, each of whom had a record of twenty years' service at Netley, and other R.A.M.C. Pensioners who had served in the Corps for the same period.

It must be confessed that many of us drove away in the bright winter sunshine with feelings tinged with sadness, but nobody can have come away from the ceremony without having the conviction that another link had been forged in the chain which binds two great nations together and without remembering that we were fighting as one people in the same great cause for which so many peacefully sleeping in Netley Cemetery had given their lives.

### Postscript.

The wheel has gone full circle and once again, on July 19, 1945, American and British Guards were formed up in the bright Netley sunshine to do honour to the ceremony of handing back the old hospital to British keeping.



[With acknowledgment to *Southern Daily Echo*, Southampton.

Lieutenant-General Sir Alexander Hood receiving back the key from Brigadier-General Spruit.

On this occasion the parade was, of course, under American Command and the 121st U.S.A. Station Hospital acted as our kindly and generous hosts.



The two inspecting Generals, Brigadier-General Charles B. Spruit and Lieutenant-General Sir Alexander Hood, arrived at the foot of the avenue at 11.30, where they were greeted by Colonel W. L. Perry (Commanding 802nd Hospital Center), Colonel C. D. K. Seaver (A.D.M.S., Aldershot and Hampshire District), Colonel W. P. Croker (Commanding Royal Victoria Hospital), and Lieut.-Colonel W. J. Moreland (Executive Officer, 802nd Hospital Center).

The party moved up the Avenue to the strains of the R.A.M.C. Depot Pipe Band and the American and British Guards were inspected.

At the close of the inspection, General Spruit delivered the following address to a large gathering, consisting of the Staffs and patients of both American and British Hospitals, as well as many local civilians :—

General Hood, brother officers, comrades of all ranks and all those who have been associated with us during our tenure of this great hospital :

General Hawley, who has been called unexpectedly to Berlin, has charged me to bear to you his warmest greetings and deep regrets that he cannot be here to-day.

We are here gathered to return to our comrades, the Royal Army Medical Corps, this historic hospital in which many of my people have worked in the last eighteen months, and through which many of our patients have passed to recovery.

In token of all this, we come to yield up its key, and with it we render back its high traditions which were placed in our charge and which we have striven to emulate.

We cannot, however, yield up our respect for, and goodwill toward, our comrades of the R.A.M.C. and the people of this community ; nor will we yield up our admiration for the greater community of Great Britain ; its collective bravery and endurance during the long years of war ; its tolerance ; its friendship and its ever-ready assistance so often and freely manifested throughout our stay in Britain.

General Hood—I offer this actual key which affords you physical access to this building and I proffer you those things which this key symbolizes to us, and which will forever bind us, that is—the memories of a high community of zeal and endeavour, and lasting respect, admiration, and friendship for the Royal Army Medical Corps, and its great chief.

General Hood then replied in the following terms :—

General Spruit and brother officers of the Medical Corps of the United States Army : It is with mixed feelings that I receive back from you this historic Military Hospital. My first and predominant feeling is one of gladness because when I handed the hospital over it was understood that you would occupy it until Victory had been achieved and we rejoice therefore that the time has come. We of the British Service hold Netley in great esteem ; it may not be the model of what a Military Hospital should be but it is hallowed in our minds by great traditions of high endeavour by our forebears and by its work for our broken men of many past wars.

But we of the British Army Medical Service have also feelings of sadness, for the handing back to us of this hospital means that our very close association with you, our American friends in this country, is drawing to an end. As members of the medical profession we had strong bonds of union as allies working hand in hand for one end. We came to know you well, to appreciate your great qualities and now we retain you forever as friends.

You have added a chapter to the history of this hospital second to none in its distinguished record. We are proud to think that you have occupied it ; we are happy to receive it back and for us it will ever have a warmer significance than it had in the past.

The 14th Port United States band and the band of the Wiltshire Regiment were in attendance and the brief but picturesque ceremony ended with the opening of the main hospital doors

and the signing of the Visitors' Book by many distinguished visitors, including the Mayor of Southampton.

The guests then moved to 121 United States Station Hospital, where they were entertained to a luncheon which proved to be a most festive occasion in the highest tradition of American hospitality, where, after the loyal toasts, both Inspecting Generals were again induced to address the gathering.

Beautifully illuminated copies of the addresses made on this occasion have been presented by the Surgeon, U.K. Base, which will always be among the most treasured possessions of the Corps.



[With acknowledgment to *The Evening News* and *Southern Daily Mail*, Portsmouth.

United States Army Nurses marching out of the Royal Victoria Hospital, January, 1945.

## OUT FROM BATTLE.

THIS was the title of an Exhibition, sponsored by *The Daily Herald* and presented by the Red Cross and St. John War Organization with the collaboration of the Army Medical Services, which was held in the grounds of Clarence House, The Mall, S.W.1, between June 12 and August 12, 1945.

"Out From Battle," opened by the Director-General of the Army Medical Services, Lieut.-General Sir Alexander Hood, *K.C.B., C.B.E., M.D., F.R.C.P., K.H.P.*, in the presence of a large and distinguished gathering, was primarily designed to demonstrate to the Public, in a practical form, the care of the wounded by the Army Medical Services and the Joint War Organization. The Exhibition fell naturally into two main parts—one, the realistic representation of Field Conditions; the other, attractively displayed exhibits in seven pavilions. By the arts of exhibition-planning "ten miles of battle country" were contrived within the pleasant garden limitations of Clarence House. The first exhibit was a model, constructed to scale from an ordnance survey map by a N.C.O. at the Depot, representing ten miles of country and presenting the visitor with a realistic "bird's-eye" view of the lines of evacuation and medical posts from R.A.P. to railhead. Details, such as shell bursts, tanks moving into action, motor ambulances, cars, etc., were all faithfully reproduced to scale.

The next exhibit was of a mock-up Regimental Aid Post in a sunken road—complete in every detail, including lay figures of British and German wounded, a stretcher-fitted Jeep, and a staff of battle veterans of the R.A.M.C. wearing the badges of a famous English County Regiment! A few steps brought the visitor to a carefully concealed and camouflaged Casualty Collecting Post. This was formed by a lorry with penthouse attached and was again complete to the last authentic detail including lay figure patients receiving resuscitation and blood-plasma transfusion. From here the visitor was conducted a short distance to the Advanced Dressing Station, established under the natural camouflage of trees and formed by two lorries with attached penthouses, and with shelters for cookhouse and evacuation sections, presenting a very realistic picture. Here, by the ingenious substitution of red ink for whole blood, a lay figure patient was shown receiving an actual "blood" transfusion; while others, dressed, fed, resuscitated and with Thomas' splints, etc., applied, awaited evacuation. The activities of the cook with his petrol cooker and other equipment aroused particularly enthusiastic comments from lady visitors!

As space did not permit of the exhibition of a Field Dressing Station or an Advanced Operating Centre no attempt was made to demonstrate the procedure of triage.

Next came a Mobile X-ray Unit complete with X-ray set, generator, darkroom and vehicle together with a lay figure in process of actual examination. A step further and our visitor was in an operating tent, complete down to the last detail of equipment required for the most elaborate major surgical operation, lighted from its own generating set, and staffed by a surgical team including a theatre Sister. The latter who was kept particularly busy answering queries from visitors had but recently returned from the Burma front. This concluded the visitor's initiation to the "forward area," and now a short distance took him to a tented ward in a General Hospital at the Base. Here long suffering R.A.M.C. personnel represented actual bed patients with "disabilities" ranging from malaria to fractured legs! The ward, in charge of a Nursing Officer lately returned from service in the M.E. and Italy, was complete down to the last detail of equipment and lighting, and much interest was aroused by the attached tented ward kitchen. The activities of the Red Cross and St. John War Organization were well in evidence here in the shape of comforts, books, gramophones and wireless sets, while those patients who were "well" enough to do so were busily engaged in diversional occupational therapy. Leaving the hospital ward the visitor was next conducted to view an

Austin motor ambulance car with a remarkable history. Abandoned at Dunkirk, the vehicle was repaired and used by the Germans first on the Russian front and, after D-Day, on the Western Front. Recaptured by the British at Commeaux in August, 1944, it still bears German military markings and number plates!

Although the Exhibition was primarily designed to demonstrate the care of the wounded it was felt that it would be incomplete without exhibits showing the wide activities of The Army Dental Corps, and the progress made in the prevention and treatment of disease in the fields of Hygiene and Pathology.

The remaining Service exhibits were therefore mainly devoted to these branches and aroused among the general public an intensity of interest equal to that shown in the purely "field" exhibits. In this section the first exhibit was a Mobile Dental Unit (Home), presented to the Army by the Joint War Organization and used for the treatment of soldiers and A.T.S. auxiliaries in isolated detachments—A.A. Sites and Coastal Defence Units at Home. The visitor next entered a hatted pavilion (the first of a series of four) where two features were mounted. The first, by means of photographs and exhibition displays, portrayed the treatment of casualties in forward areas ranging from dug-in tents in the Western Desert to blitzed churches and cellars in Italy and North West Europe, and the story of evacuation by road, rail, sea and air from fighting fronts to Homeland. Included also was a photographic display of the work of a Convalescent Depot, culminating with the return of the soldier to full active life. The second feature was a remarkable display of enemy medical stores and equipment abandoned in the German retreat to the Rhine. Items ranged from "ersatz" blood-plasma to blankets and dressings made of paper!

In the next pavilion the exhibits dealt respectively with the Army Blood Transfusion Service and penicillin. By means of standard equipment, photographs and wall displays, the complete process of collection, storage and distribution of blood supplies to the various fronts was fully demonstrated, the special containers and methods used for air dropping evoking particular interest. But perhaps the greatest interest, both lay and professional, in any one exhibit was that aroused by penicillin, for here was a complete demonstration of how this revolutionary life-saving remedy is produced, tested and used.

The third pavilion was devoted to the activities of The Army Dental Corps in the field. Among the many interesting exhibits were models illustrating the advances made, and the high standard attained, in the prosthesis of maxillo-facial injuries. A replica of a field dental surgery, a large range of dental instruments and appliances, wall diagrams and photographs, completed a fascinating picture of the work of the Corps.

Entering the next hut, devoted to hygiene, the visitor found himself in the midst of jungle warfare. Here in a cunning "build up" to simulate actual jungle conditions he saw a soldier asleep in a fox-hole, protected from the dreaded malaria by a bivouac mosquito net. Hard by were two other soldiers, fully dressed in the new jungle clothing: one asleep, with face and hands protected from mosquitoes by specially impregnated fish netting veil and gloves, the second on guard with all exposed skin surfaces protected by repellent lotion. Other exhibits in the pavilion included the means and methods by which a pure water supply was ensured to troops in the field, a comprehensive display of the various types of rations devised to give the soldier a sufficiency of balanced food in all circumstances and, finally, a practical demonstration of the new insecticide D.D.T., one of the most important discoveries of the war. Here its properties were vividly demonstrated by the corpses of hundreds of flies lying at the foot of a wall treated with D.D.T. solution and upon which the flies had ingenuously alighted. What visions this conjured up of the dwellings of the future rendered free from flies, mosquitoes and other insect pests by the impregnation of wall-paper, distempers, etc., with D.D.T.!

The visitor now passed from the Army Medical Services to the realms of the ancillary and supplementary work of the Red Cross and St. John Organization.

As an example of work in the field was the welfare officer's marquee fully furnished with a well chosen and varied library, games and illustrated papers.

Next followed a pavilion which explained the various services of the Joint War Organization from convalescent homes to stores and comforts ; from guide services to wounded men to services to relatives ; from trained nurses to transport ; from trained personnel, both men and women, to the Central Hospital Supply Services and Overseas Red Cross Commissions.

A second pavilion, devoted to occupational therapy, was filled with a most attractive collection of articles ranging from embroidery to toys, and from handbags to cigarette boxes in perspex, all of which had been produced in hospitals on the various fighting fronts by patients under the instruction of trained occupational therapists.

Thirdly, there was a pavilion devoted to the skilled work of the Hospital Libraries Department. A practical exhibit demonstrated how voluntary bookbinders reclaim thousands of old volumes and strengthen flimsy books and magazines. Altogether, including new publications purchased, four million volumes have been put into circulation among the wounded!

A seal was set upon the success of the Exhibition by a visit on June 19 of our Colonel-in-Chief, H.M. The Queen, while a little later a visit was also paid by H.M. Queen Mary.

The total attendance figure was just sixty thousand and, as the expenses of the Exhibition were generously defrayed by the *Daily Herald*, all proceeds will be divided equally between the Army Benevolent Fund and The Joint War Organization.

This short account of an unusual exhibition would not be complete without recording the universal tribute paid to N.C.O.s and men of the R.A.M.C. and A.D. Corps in charge of respective exhibits. It was repeatedly remarked by the public that the pleasant and informative manner in which these personnel imparted information, and cheerfully answered all questions put to them, materially added to the enjoyment as well as instruction of visitors to the Exhibition.

NOTE.—This Exhibition was the responsibility of Brigadier R. K. Mallam, *O.B.E.*, who was assisted in no small measure, by Colonel D. C. Scott, *C.B.E.* Lieut. Rose Kelly, R.A.M.C., a S.B. officer, supervised the arrangements which led to such smooth running.

The greatest credit reflects on these officers and on all those who took an active part in such a unique Exhibition.

ROYAL ARMY MEDICAL COLLEGE  
AND  
ROYAL ARMY MEDICAL CORPS HEADQUARTER MESS.  
(A BRIEF NOTE.)

THESE two, so closely connected, have survived the war years with comparatively little damage. They continued to carry out their normal functions throughout although experiencing various vicissitudes.

The Mess was completely blacked out and stripped of ornaments and pictures but maintained its traditional hospitality so far as rationing and shortages permitted. In the long nights of winter its darkened and chilly corridors were graphically compared with Dartmoor by one old servant. His comparison was on purely theoretical grounds.

A strict rationing system which, perforce, included all types of refreshment was inevitable, but, with one exception, of which more anon, meals were served punctually. Only once was there no coffee for lunch and the Mess is believed to have been the only place in London where white table cloths and table napkins remained in use during the whole war.

Entertainments were reduced to a minimum but there were a few outstanding occasions which merit recording.

The Farewell Dinner to Lieut.-General Sir William MacArthur was held on August 16, 1941.

On November 19, 1941, there was a lunch to the Heads of Allied Medical Services. The guests of Honour were the Principal Medical Officers of the Belgian, Czech, Fighting French, Polish and U.S.A. Armies. Other guests included: Lord Dawson of Penn; Lord Horder; the Directors-General of the Navy, the R.A.F. and the E.M.S.; the P.R.C.P., the P.R.C.S. and the Master of the Society of Apothecaries; and Medical Members of Parliament. Sherry was in good supply and it was quite an occasion.

On August 17, 1942, there was a farewell lunch to Major-General D. Clewer, the retiring Director of The Army Dental Corps.

Sir Percy Tomlinson was tendered a Complimentary Lunch on September 27, 1943. The guests included: Peers of The Realm; leaders of the Profession; representatives of Canada and the U.S.A. and no fewer than 1 Vice-Admiral, 14 Generals, 12 Brigadiers and 4 Colonels. It was a well deserved tribute to Sir Percy.

The American Mission were entertained to lunch on March 21, 1944.

There was a farewell "At Home" for the retiring Matron-in-Chief, Dame Katherine Jones, on July 17, 1944.

One recent outstanding event was the visit of representatives of the French Military Medical Services in May, 1945. The farewell dinner was a memorable event notable for our G.'s speech in French and a typical "guest night" feeling after dinner.

An even more cheerful event was the dinner to the retiring Consultants on June 15, 1945. Speeches and musical items were alike of a high standard and there was a distinctly peacetime atmosphere in the Mess.

Apart from these formal occasions many distinguished guests were entertained from time to time. Amongst these were His Majesty the King of the Hellenes, and Sir Claude Auchinleck. There were many others from Australia, Canada, Denmark, France, Holland, India, New Zealand, Poland, Russia, South Africa and elsewhere.

Our most recent guest was Field-Marshal Sir Bernard Montgomery whose portrait, bearing greetings to the Corps, is reproduced in this number of the Journal.

After its initial disruption the College continued to work in a modified form, at first dealing largely with the Officer intake. The Vaccine Department was incontinently moved to Tidworth on the outbreak of hostilities.

In September, 1940, the Hygiene Department was transferred to Mychett after considerable damage had been done to both it and to the Library by an H.E. bomb in Atterbury Street. The Hygiene Laboratory was then taken over by a Dental Laboratory which remained in possession until the return of the Hygienists in February, 1943.

In December, 1939, the Radiological Department moved into the former Vaccine Department and in October, 1940, the Army School of Radiology was established.

In August, 1940, the Tropical Medicine Department was reconstituted and continued to work throughout the war. As time went on its activities gradually increased until it is now as efficient as ever.

Valuable work was done by a special team which later blossomed forth as the "Army Malaria Chemotherapeutic Research Unit."

This was in addition to research work undertaken by the Hygiene Department both before and after their period of rustication.

The Lecture Theatre was used for many lectures and conferences among the most interesting being the accounts given by the Director-General of his Overseas Missions. Incidentally, never before has a Director-General made an Overseas visit during his tenure of Office. These Missions included visits by air to the U.S.A., to the Middle East and to India and Burma.

Pre-"D-day" conferences, deeply shrouded in secrecy, were also held in the Lecture Theatre.

#### ENEMY ACTION.

The College and Mess are situated in what proved to be a rather vulnerable area and it is surprising that so little serious damage was done. There are many graphic descriptions of incendiaries bouncing off the roof like hailstones, and of fire-fighting adventures when they did not bounce off the laboratory roofs. One such was extinguished, in a moment of stress, by a bucket of coal.

A shelter was established in the basement where many slept for weeks. The billiards room became a favourite evening resort and it was demonstrated that even the less slender could get under a table with commendable celerity.

The two most serious incidents were the H.E. bomb in Atterbury Street on December 22, 1940, and the fire in the roof of the Museum on January 11, 1941. An incendiary lodged in the previously damaged roof and the combined efforts of the fire and eight high-pressure hoses resulted in considerable damage being done.

There was only one fatal casualty. The N.C.O. in charge of the Guard was killed by a small H.E. bomb which fell in the quadrangle.

There was a good deal of damage in the vicinity and, amongst other changes, the old ship's figure-heads have gone.

On July 21, 1944, at 12.20 hours, a V.I. fell in the Thames close to Vauxhall Bridge. The Mess suffered quite severely from blast; many windows were blown out and there were glass fragments all over the dining room, the ante-room and the smoking room. Structural damage was slight and no one was injured. Lunch was served five minutes late. It is recorded that on his arrival a very senior officer asked three questions: "Any casualties?" "Any beer?" "Any lunch?" Satisfactory replies were given to all.

Now that the anti-blast walls and sand-bags have gone neither the Mess nor the College bear many outward signs of their ordeal! It is interesting to note that the statue of Sir James McGrigor has remained undamaged.

#### PERSONALIA.

Colonel F. S. Irvine succeeded Major-General Brooke Purdon as Commandant on June 12, 1940, and is still with us. He has been a tower of strength during the war years. A wise counsellor and a perfect host, he has also a serene indifference to personal danger which was a source of inspiration to all during the nights of heaviest air attack.

It would be invidious to mention any other officer by name.

It is felt that a brief mention of the mess servants is not only deserved but will be of interest to Officers of the Corps.

Pomfret remained at his post throughout the war to welcome arrivals and speed the departing on their way. He was never ruffled and remained, as ever, guide, philosopher and friend.

Williams' sole source of worry and anxiety has been the shortage of supplies. Even the advent of the V.I. which covered his just-vacated table in glass splinters left him quite unperturbed.

Mr. Smith has had the onerous task of supervising the catering and has succeeded in maintaining a high standard in spite of manifold difficulties.

Three old and trusted mess servants have come through with spirits unimpaired—Palmer, Ford and Beesely. They can still be relied upon to meet any sartorial emergency.

George Turner, the storeman, is still the same cheerful soul. It takes more than raids to alter his life in the Mess.

On July 2, 1942, A.T.S. personnel were posted as waitresses and mess servants. They have done excellent work and have always been courteous and patient through many trying times.



## NEW LAMPS FOR OLD ?

By Colonel R. A. MANSELL, O.B.E., M.B.,  
*Royal Army Medical Corps.*

[Received June 25, 1945.]

WE are at the end of an era.

Such a saying invites neglect for its easy appearance of the trite and obvious, or annoyance for its assumption of a didactic omniscience. This is not a new thought, either of itself or in relation to these days. To many it has become clear that those who are to guide the future and, equally those who will live under their guidance, must do so without knowledge, attainable in their own personal way of life or ascertainable from the lives of any of their contemporaries, of ideals and conditions which inspired or marred the adolescence of the elder half of the world's population.

Youth was to have had its chance after "the last regrettable disturbance in Europe" to shape anew the world. Whether it was the fault of youth or of age that the chance was not taken is not the purpose of this article to discuss. It is, however, worth suggesting that the age whose youth first and elderliness now—the times of planning for ambitious work and then for earned rest—have both been shattered in a lifetime, that age thus treated is not likely to interfere too high-handedly with what the young will make of *their* future: *we* hope that we can scarcely be so disturbed again in our lifetime: shall we worry if they can or will not so read the past as to protect their future? Undoubtedly we shall; but perhaps not so actively, perhaps more by words than by deeds—as *laudatores temporis acti*, and we all know what bores such are and how little attention is paid, finally, to their preaching.

Before the stream swells unduly wide and deep, then, here is a trickle of that looking back to see better forward. For, unlike that of the body, the eye of the mind may see better into the dark after gazing at the light—or vice versa, if you will. As we are at the end of one era, we are equally at the beginning of another.

Let us ask ourselves if the ideas and ideals of the dead past are to be left standing whilst those of the future are now being born?

Hygiene—some with smaller views call it "preventive medicine"—is rapidly coming to its own as *the* force in the practice of medicine. We, in the Army, have been content with a definition which for many years has not changed; at any rate, we have not taken the trouble to change it. See how it runs:—

*Hygiene* is the science of the maintenance and promotion of health and the prevention of disease.

*Sanitation* is the practical application of the science of hygiene to the varied conditions of life.

*Conservancy* is the collection, removal and disposal of waste products such as excreta and refuse.

We used to like to claim, quietly perhaps but none the less firmly, that the Service pioneered this science into the wider spread of civil life. Whilst we may ask ourselves whether that series of definitions is good now, we must ask you whether it is good enough for the future.

There is an art as well as a science of hygiene. None who has been privileged to watch the workings of a skilled practitioner will deny that. What is the difference? Is it not that whilst science is ruled by inexorable laws which it cannot break, art is guided by rules which are bendable to its purpose. Hygiene is concerned with the provision of those conditions of living most favourable to the advancement of physical and mental health. Sanitation—the sanitary sciences, in which there may be, and indeed are, artists also—is, so to speak, the lay brother of hygiene just as, for instance, massage is of orthopædics and physical medicine, radiography of surgery, medicine or radiology; it is concerned with the provision and maintenance of the most suitable environment for healthy life. Conservancy is but one of the many subdivisions of sanitary science—such as building, heating, ventilation, water supply—why single it out as a major heading to our text?

"Hygiene is the study of man rather than matters.

"The study of the development of the soldier is infinitely more important than the study of the disposal of his fæces."

Spend a little thought, then, on first principles. And having done so turn to their larger applications. We are not here writing a textbook—God forbid: "Oh that mine enemy would write a book." The intention is merely to stimulate thought towards reconstructive criticism.

Scales of accommodation and the problem of ventilation are closely bound together. Our occupancy of barrack rooms has, in the past, been based on more-than-theoretical considerations of ventilation and of the direct spread of the so-called "droplet" infections. Both these considerations were neatly satisfied by the allotment of 600 cubic, 60 square and 10 linear wall feet of space to each occupant. This allotment fitted another requirement also, about which no one but those who had to live in the barrack rooms said much; yet it was, and is, perhaps the most important of the three. Early in the war down went the scale to 550 cubic feet and 5 square feet and 5 linear feet between beds. Then it fell to 345 cubic feet; this just to satisfy consciences and permit the occupancy of some places otherwise barely justifiable—rooms and attics in which the "domestic" servants of some hotels and lodging houses had been permitted to dwell, and the like. And soon, by circumstances outside our control and to which we had to bow, the standard was taken down to 30 square feet per man—half of that essential, mark you, for the preservation of health. True there were rules about head separation and "topping and tailing." But those who know the British soldier—and officer—and who have been into Nissen huts containing, with official blessing however grudgingly given, eighteen men know without any shadow of doubt that ventilation, piously supposed to exist, could never be; and that separation of heads just does not happen in any appreciable approximation to the theoretical essential. Further, we have put prisoners of war, again perforce and never of desire, into accommodation at twenty square feet per man. Is it wrong, even yet, to ask ourselves why, the theoretically inevitable widespread epidemic of "droplet" infections has not occurred? For it has not. Beyond saying to the soldier, on this particular score, and to those charged actually with providing his accommodation, that air is an essential, indeed the most urgently essential "food," and that he should see to it that he does not breathe in what his neighbour has just breathed out, because he would not take his other food or drink that way, can we really say more?

We can say, as Mr. Churchill has said with his peculiar and careful felicity in the use of words, that every man is entitled to "food, work and a home." That is the point which has been left in the air a few lines above. Sixty square feet provides reasonable room for a man to live and move, to sit and read, write or work: thirty square feet allows a man to get to his bed—no more.

In the modern barracks we aim to provide the sitting-room separately from the bedroom. What are we now going to say about the size of the latter—and why? We have got to have our argument ready; and it has got to be a watertight one; and we have got to believe and be ready to prove it; otherwise we shall not be able to fight for it with that skill and determination which alone will carry it through.

Consider another of our hitherto fiercely pressed teachings. "Kill that fly." "Flies spread disease." Excellent maxims both. But, whilst not attempting to deny that the matter of them can, and may, be true, let us ask ourselves whether it can be so much the easier as to justify the relative neglect which had grown up of the other side of the picture of the spread of the "intestinal infections." In passing, let us abolish for ever that horrible and totally inaccurate description of the typhoid-dysentery-cholera group of infections as "excremental diseases."

There is no denying that the house-fly is a loathsome beast; or that it can carry and deposit the organisms of these infections; or, indeed, that it does so. But do we really believe now that it is, even in warm climates, the major instrument of spread of these infections—in spite of that single famous chart repeated from book to book? We have now at our disposal insecticidal weapons of as yet unknown power, and it needs little imagination to foresee that the fly should have but small risk of being blamed in the future: it won't be

there, at any rate in numbers large enough for the least of us to take refuge behind it. And yet there will still be dysentery outbreaks unless we can turn with equal enthusiasm, and success, against the human carrier. Of that famous aphorism of Andrew Balfour we remember "the dust of dried dejecta and the filthy feet of faecal feeding flies"; but for a long time we forgot the "filthy fingers." We know now with certainty that, in this country at any rate, we can, in nine cases out of ten, abort a dysentery outbreak if we get in early enough and cross-question the cooks and dining-room orderlies with tact and intelligence. The carrier is there, more often in the dining-hall than in the cook-house; and if we remove him (or her) the cases stop within forty-eight hours or less. Our problem then is to eliminate the carrier; and though a great deal of work has been aimed at this, none has yet gone completely far enough. Our task meanwhile is primarily to avoid the carrier and to ensure that, if we have missed him, he is so supervised and trained in personal hygiene that he creates as little risk as possible.

To revert to that famous chart of flies and dysentery in, of course, Poona. Isn't it possible that the external atmospheric conditions which best suit the fly also best suit the organisms of the "intestinal infections" in their brief life outside the human body? May that not largely explain those beautifully parallel lines? There is a very considerable element of explanation of that nature in regard to many other infections; especially, for instance, of the "droplet" class.

To pass to smaller things. As we have now reminded ourselves of washing let us take as examples a few points about sinks and wash-hand basins.

Some years ago it attracted attention that in practically all cases the surface of the front edges and the bottoms of cook-house sinks were damaged, and in the majority of cases so destroyed as to warrant the description "unhygienic"; and this very early in their working lives. The explanation given was that this occurred in the cleansing of the larger and heavier cooking vessels.

Some thought and a little inquiry into manufacturing possibilities produced the idea of the hard-wood front lip which became, pre-war, the standard military pattern. The floor of the sink can obviously be protected by many types of removable mat, from wood to rubber, provided from unit resources. Everyone should have been happy—but they were not. Incidentally these ideas, simple as they now sound, took several weeks to elaborate and six months' trial before they were accepted. The new pattern began to appear in issue three years later. However, those who did not approve of the wooden lip were the cooks; and rightly, as will appear. The enthusiasm of invention and acceptance settled to simple satisfaction and later to irritation at delay. During this last period attempts to apply hastening stimuli by continuous reporting of damaged sinks slowly brought appreciation of the fact that early damage to the front lip was clearly, by its rough and dented appearance, due to the dumping thereon of heavy, sharp-edged metal articles; but the older damaged sinks invariably showed a beautifully smooth, though porcelain-denuded surface. Clearly the type of damage initially suffered—or applied—which removed the porcelain finish and exposed the "clay" had been altered or replaced by some other action. It is, or was, commonly known amongst Army cooks, but rarely amongst officers, that there is no surface to compare with such a one for sharpening kitchen and carving knives—and a steel was not then part of the normal equipment of the cookhouse.

Well, let us read the moral of that into a discussion which arose recently as to whether ablution rooms in barracks should not always be sited in close relation to latrines, and at any rate between them and dining-halls and cook-houses. This, of course, ties up with what has been written above on the dysentery transmission question and is equally a basically sound idea. The same thought caused the Royal College of Physicians in their recommendations on the housing question and the planning of "working class" houses to require that the bath-room and W.C. should be one room—an utterly abominable piece of planning.

When this discussion had worried itself round the arguments for siting the "ablutions" (a) near the latrines, or (b) near the dining-hall, it wore itself out and died.

But the real answer, isn't it, is the towel? Wherever you put a washhand-basin few if any will use it, for that purpose, unless they can dry their hands after so doing. No soldier takes his towel to the latrines, or to his meals. There was a Regimental Depot at which, in the early 20's, the recruits were paraded to the "ablutions" with towel and soap ten minutes before each meal and passed into the dining-hall via a hand inspection; but that doesn't, and perhaps can't happen everywhere. Anyway, the moral is that if we want more frequent use of the washhand-basin, and particularly at odd times of the day—and unexpected ones—we must be prepared to provide the essential amenities of soap, nailbrush and a means of drying—whether by towel or by hot air, and by the supply of liquid soap from containers. When that has been done the argument about siting can continue with profit.

This naturally raises another point regarding these same fittings. How many barrack washhand-basins, when you go round to see them, have plugs? Very few. Why? The soldier "pinches" them as fast as new ones are supplied. And why? You know the answer to that, don't you? Just simply and solely because a washhand-basin without a plug won't hold water; so every soldier keeps himself supplied with a plug. Really, it's too easy. Now there are quite effective types of plug which are essential parts of the fitting and irremovable from it; these are not greatly more expensive than the loose article, certainly not more so than regular monthly replacements. But they haven't arrived in the Army yet. One wonders why? Surely it can't be because no one has thought of this answer before—or asked a soldier about it.

Augustine Birrell once wrote to the effect that none could be more unpopular than the man who constantly said "why" save only he who professed always to be able to answer that terrible question. Let us hope that at least we have escaped the greater condemnation and in defence cite the Platonic dictum that "Life without the spirit of inquiry is not worth living." There is, however, one more argument that urges itself to be made. It arose in the search for some new examples and phrases with which to stress the value of hygiene to a rather special audience.

It might carry us a long way further than we have time, or space, to go now, so it is put to you here in the barest outline only and you can work out for yourselves whether it is really a "hygiene" problem, taking the wider view, or not.

What is the most common, meaning universal, disease or disability from which mankind suffers; and is it a normal, or necessary, handicap of human life? If we find the answer to the first part of that question and then assure ourselves that that to the second is a negative, surely this must be a hygiene task of the first order, especially in the Service, and more especially still if there is any question of infection in the matter.

Think; and then say if the disability of *fear* is not so common as to be practically universal; if it is not really an abnormal condition, one from which man should not suffer; and if it cannot be infectious to a most virulent degree and associated with remarkable frequency, with equally or more disabling complications and sequelæ. Fear of the unknown: fear of being known to fear: maybe they're the same, maybe they're different: we haven't time now to argue. But, put thus, is the prevention of fear a hygiene problem?

What, then, is fear? Perhaps as good a general definition as can rapidly be got is to be found in Gerald Kersh's book "Brain and Ten Fingers."

"Fear is hollow in its centre, and round it is nothing."

Isn't it just that fear is loneliness? and "Every human being is lonely: every human being has probably always been lonely." Does that give us enough to start on? That, and the sentence put in the mouth of David Niven in the film "The Way Ahead." "You know, that's one of the great things about the Army, you *need* never be lonely."

We all know what happened to the originator of the Socratic method, and some of us are prepared to be content to accept in later silence all the consequences which are still applied morally, if not physically, of adherence to the belief that in no other way shall we arrive near to the ultimate truth.

The times are being changed. Are we to change, or to stand still, in them?

## MAJOR DIFFICULTIES EXPERIENCED IN THE ESTABLISHMENT OF 600 AND 1,200 BED GENERAL HOSPITALS IN NORMANDY.

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ONE of the most important factors on which success or failure of a seaborne operation depends is the rapidity with which the base is established following the entry of the "assault" and "follow-up" troops. This applies to the medical area in the base, as much as it does to those established by other Services, for until such time as sufficient hospital beds are available to permit a "holding" policy to be introduced, General Hospitals must continue to operate on a "C.C.S. basis" with the resultant fatigue to surgeons and nursing officers, strain on the administrative staff—especially the Evacuation Staff—and, above all, to the detriment of the wounded.

In the early stages of the Campaign in North West Europe certain difficulties arose which materially delayed the opening of General Hospitals forming the main component of the medical base area. They occurred both in the pre-invasion phase and after arrival in Normandy. The fact that they were surmounted reflects the greatest credit on each individual hospital, and they have been recorded in the hope that the suggestions made as to how they might have been avoided may be of some use in future planning.

It would appear on the surface that the speed with which a large number of General Hospitals could be established in any Base Area is entirely dependent on the "phasing in" dates of individual units. This is only the case, however, if the following factors are taken into consideration :

(1) The state of readiness of the unit ; (2) Strict adherence to the Second Key Plan ; (3) The necessity for close co-operation between the R.E. and R.A.M.C. Services ; (4) Adequate provision of Pioneers ; (5) Adequate arrangements for the reception of personnel and equipment of General Hospitals on the "Far shore."

### STATE OF READINESS.

In assessing the state of readiness of any unit, attention is mainly focused on its training, its personnel and its equipment. All are of equal importance. If one is deficient 100 per cent efficiency will never be attained. It is essential that the unit is given the opportunity of becoming a team and its labours in this direction must not be hampered by constant changes in personnel, by lack of training facilities including training stores, or by outside commitments. While these factors were fully appreciated, the planning staff were driven, by general scarcity of both medical and nursing officers in the Corps, into using General Hospitals as a pool from which reinforcements could be drawn, with the inevitable and unfortunate repercussion on these units as a whole.

In the pre-invasion stage it was found necessary to "milk" the vast majority of General Hospitals of their personnel. They were required for surgical teams, used to "bolster up" early phased-in medical units, for medical crews to man the L.S.T.s required for evacuation of casualties, for reinforcements and for duties in the U.K. The personnel so used, did not rejoin their parent units until the latter were fully established in Normandy. It is obvious, therefore, that the bulk of General Hospitals were unable to mould themselves into a team, as many of their officers, nursing officers and other ranks were employed elsewhere. In addition there was an acute shortage of training stores. Canvas was almost unobtainable owing to the tremendous demand for concentration and marshalling areas and the establish-

ment of "shadow" camps. Hospitals were indeed fortunate if they had more than ten days' training in the pitching of hospital canvas.

Again, certain General Hospitals found themselves attempting to mobilize while running large static installations in the U.K. The personnel were so busy professionally that they had little or no time to learn the equally important military side of the work they would have to undertake "on the other side." On the other hand, some hospitals found themselves unemployed and "buried" in the heart of the country for several months. In these units it was noticeable that the initial bloom of enthusiasm and expectancy gradually faded. Such training as was possible with the limited available resources became tedious, cohesion was lost owing to continuous changes in personnel, and the hunger for professional work overwhelming. In fact visits by senior administrative officers were awaited with an eagerness unusual in such units, as it was felt they might bring some exciting news of the future with the resultant release from boredom.

There were many factors which led to this unfortunate situation not the least of which was the accommodation problem. It has to be remembered that in the pre-invasion phase the enormous force, both British and U.S., who were to be employed in the assault and build-up, had to be housed in the U.K. Suitable accommodation for units such as General Hospitals was at a premium. If the circumstances had permitted, the ideal would have been to arrange for the early phased-in units to mobilize and train alongside the later phased-in units, the latter being those temporarily running static installations. With adequate stores and space for training a period of six weeks would have been ample to mould the recently mobilized General Hospitals, and if, for security or other reasons, it was essential to extend the period of waiting, professional work would have been readily available. Such personnel as are required must be taken from the latest phased-in units, and should, where possible, be returned at least four weeks prior to the embarkation of the unit concerned, thereby permitting the C.O. to allot specific tasks to his various key and other personnel.

Mention must also be made of the scarcity of administrative officers with a *detailed* knowledge of the organization and training of a General Hospital. This is a matter of the utmost importance and it is considered that a large dividend would be paid if carefully selected ex-C.O.s of General Hospitals, fully briefed, were each placed in a group of six hospitals in the pre-invasion phase. Uniformity in training, administration, and layout would then be possible. Such a suggestion would have the whole-hearted backing of the C.R.E. for, while it is frequently possible to get any two doctors to agree on the diagnosis of a case, it is *absolutely* impossible to get two C.O.s to agree on a uniform layout of a 600 or 1,200 bedded hospital. This is no sweeping statement as can be borne out by a long suffering C.R.E. who was responsible for the layout of 24 tented hospitals—all different, admittedly in detail, but still necessitating changes in R.E. plans.

While it was found impossible to "freeze" the specialists, duty medical officers and nursing officers, it was fortunate that the administrative "triumvirate"—the C.O., the registrar and the principal matron—remained in the majority of cases unchanged. It was largely due to their alertness and enthusiasm that the difficulties mentioned above were overcome. A General Hospital, however, is a very self-centred community and it is essential that any clash of personalities in the administrative triumvirate is speedily dealt with. All are senior and of long service and this factor may, perhaps, cause a C.O. to hold his hand in advocating a change to his senior administrative officer. In the very few cases however where unpleasantness did exist, the matter did not come to light until a short time after the arrival of the unit, when investigation into difficulties in the opening and running of the hospital revealed the unfortunate fact. It is felt that the officer—suggested above—appointed to supervise the training of a group of hospitals would have noted any dissension, and taken the appropriate action before it could in any way jeopardize the work of the unit in a theatre of operations.

Without doubt, deficiencies in G1098 equipment, especially tentage, presented the major difficulty in opening the medical base in Normandy. In the planning stage it was decided

that General Hospitals, 600 beds, should be moved, in turn, to two selected sites. At these locations G1098 and I1248 equipment was issued and facilities were arranged for it to be checked, re-packed on the "block" system, and marked. It was then despatched to Didcot, accompanied by a detachment of the unit concerned, to assist in the stacking of equipment in blocks ready for shipment. After this had taken place the detachment rejoined its parent unit, and the equipment, shipped independently, was delivered to the hospital on the site allocated on the far shore. The equipment of the General Hospitals 1,200 beds was assembled at Didcot, and facilities were provided for its inspection by the unit prior to its being moved to the port. It was shipped and delivered to the unit in the same manner as the equipment of the 600 bed hospital.

It will be seen, therefore, that there was an essential difference in the checking of the equipment of the two types of hospital. In the case of the 600 bed unit, the equipment is broken down and re-packed on the "block" system. To achieve this, very careful checking and packing was necessary. The 1,200 bed hospital on the other hand was not required to break bulk, although the O.C. was empowered to inspect his equipment at the R.A.O.C. depot at which it was being assembled. Until the later stages of the campaign, when the system of escorts for the equipment of 1,200 bed hospitals was introduced, both types of unit were left in the uncomfortable position of having no idea what was happening to its equipment in transit.

In the assembly of the vast amount of equipment required for a large scale operation it is possible, in fact probable, that mistakes are made, but, while a General Hospital can operate deficient of certain instruments, its tentage must be complete in every detail, otherwise valuable accommodation is lost. The value of checking was proved by the fact that 600 bed General Hospitals showed only minor deficiencies, while the 1,200 bed General Hospitals were lamentably short of essential tent poles and canvas, in fact, it is safe to say that not one single 1,200 bed General Hospital arrived with its complete tentage. In passing, it should be noted that it is just as important to check tent poles as it is to check canvas.

It is suggested for future planning that a small party of O.R.s, headed by one of the unit Q.M.s in the case of a 1,200 bed General Hospital or by a Q.M.S. in the case of a 600 bed General Hospital, are despatched to the assembling depot to check and mark all G1098 and I1248 equipment, and this party remains with the equipment until it is delivered to the unit. By so doing, the unit would be in a position to know how and where the equipment is stored aboard ship and what portion, if any, has had to be allotted to another ship. Such knowledge would be invaluable to the Docks Operating Coys., to "Q" Movements, to Ordnance and to the administrative medical officer responsible for the establishment of the Base. Careful numbering of the various crates of equipment would enable swift and accurate checking of deficiencies to be made, with the resultant speed up in demanding replacements.

#### ADHERENCE TO SECOND KEY PLAN.

Except in the most exceptional circumstances, it is unlikely that the sites selected in the First Key Plan for the establishment of the various installations in the Base—taken from a maze of information, maps and air photographs, made available to the planning staff—must be considerably modified. It is essential, however, that the Second Key Plan made "on the ground" must be adhered to as far as is humanly possible. This requires the closest liaison with all concerned. In the Normandy Bridgehead it was decided after arrival to have two hospital areas some three miles apart. This decision was very largely made by the Chief Engineer and was governed by the lack of an adequate water supply. Under the existing conditions it was found that the speed of the opening of a General Hospital was very closely related to the speed with which water points could be established on the various hospital sites. When work was well under way on the first of these areas, and was commencing on the second, the plan had to be abandoned due to the activities of an enthusiastic American Airfield Construction Unit who, commencing work with 20 bulldozers late one evening, broke

all existing records in the establishment of an airstrip and by morning had rendered the area untenable from a medical point of view. This was a major disaster to the Army—although no doubt of great benefit to the Air Force—for it necessitated a reversion to the alternative plan of having one large hospital area and the laying of several more miles of piping. The result was delay in getting water to the hospitals. This unforeseen circumstance made it increasingly obvious that General Hospitals of 600 and 1,200 beds are sadly lacking in water vehicles and trailers. It has to be borne in mind, as stated before, that until such time as sufficient beds are established to permit casualties to be held in a theatre, all General Hospitals must of necessity, act on a C.C.S. basis. All personnel are fully employed and have little or no rest. Attached personnel, e.g. Pioneers, are also fully employed on stretcher-bearer duties. Personnel for the carriage of water simply do not exist, and it was found by most hospitals that the driver of the one and only water vehicle worked the hardest of all. Great credit is due to those who evolved the ingenious methods to circumvent this difficulty but, despite all ingenuity, it was obvious that 600 bed General Hospitals require two water vehicles while 1,200 bed General Hospitals require three.

#### CO-OPERATION BETWEEN R.E. AND R.A.M.C. STAFFS.

The general principles of the layout of a General Hospital, 600 and 1,200 beds, are clearly laid down in the Manual of Military Engineering, Vol. VII, Part VIII, of 1944 (Expeditionary Force General Hospitals), Section 3. It is essential that the earliest information is given to the C.R.E. concerned, of the policy regarding the phase to which individual hospitals are to be constructed, for, unless this information can be given in the very early planning stage, it is probable that certain R.E. stores required to complete the various phases will not be forthcoming when required, as they are unlikely to have been included in the shipping programme. This is not always easy to estimate, as it is inevitably linked up with the general staff estimate of the situation some weeks after landing has been effected.

While portable latrine seats are included in the G1098 scale it is for consideration whether it would not be wise to include certain other camp structures in the assembly of equipment of General Hospitals to be established under canvas. Properly constructed cook-houses and ablutions make an enormous, indeed essential, difference to any tented camp, but they are of the greatest benefit to a General Hospital and should have a high priority in the phasing-in of R.E. stores. They should not be considered as "frills," for in the early stages, when the turnover of patients in hospital is high, and crash expansion to 50 per cent of its normal holding capacity a distinct possibility, the adequate cooking of food under reasonable conditions and as speedily as possible is highly desirable. It should be remembered that it is not always possible to call forward these stores. The emergency demands on shipping are normally devoted to the needs of the front line troops and it is for this reason that the above suggestion is made. In Normandy, while the lack of camp structures did not immediately delay the initial opening of the hospitals, it unquestionably delayed the smooth running of these installations to the detriment of the patients.

#### PROVISION OF PIONEER LABOUR.

Through the generosity of the staff, a liberal supply of Pioneer Sections was made available to all General Hospitals. As each hospital arrived four sections (100 men) were attached. Two sections were withdrawn after a week and a third after a further period of two weeks, leaving the unit with one section permanently attached. Nothing but the highest praise can be paid to the work carried out by these men and it is true to say that without them the General Hospital could not have carried on. It would have been of inestimable value, however, if the Pioneer Section had been attached to the early phased-in hospitals a month before their departure from the U.K. They would then have had the opportunity of learning the nature of their duties both in the establishment of the hospital and later when it was fully functioning. As the later "phased-in" hospitals arrived, the Sections withdrawn, as



indicated above, would have been of even greater use to the units to which they were attached, than was already the case. It is realized that such a procedure must interfere with the administration of the Pioneer Coys. concerned, but, as it is an accepted fact that they are essential, it is considered that the value obtained should outweigh this difficulty. This need not be regarded as a precedent for there is no reason why they should not form an integral part of the hospital in much the same way as the Fire Section used to be included.

#### ARRANGEMENTS FOR THE RECEPTION OF PERSONNEL AND EQUIPMENT.

As has been stated, it was decided in the planning stage that personnel and equipment of General Hospitals would be shipped independently. In the very early stages of a campaign of this nature, it is possible, in fact essential, to arrange that both arrive simultaneously. As time goes on, however, various factors may cause a delay in the arrival of one or the other. Bad weather may make it impossible to unload stores ships, while it may still be possible to discharge personnel craft. Again, a sudden change in the day's priority of unloading—ammunition, for example, might be urgently required—may result in the ship carrying hospital equipment having to lie off shore for a longer period than was originally intended. This and many other factors only too well known to the "Q" Movement Staff can, over a period, cause serious delay in the "marrying up" of personnel and equipment shipped independently.

It might appear to the casual observer that the Movement Staff should be able to delay the arrival of personnel once it has become obvious that there would be a delay in the arrival of equipment. The reason why this is not possible is immediately obvious to those who have passed through what has been termed the "Sausage Machine." Into this machine—with its inlet in the U.K.—were crammed the thousands of units to be employed in the invasion. Slowly but surely the machine revolved, passing the units through the concentration areas, the marshalling areas, on to landing craft, across the Channel, and finally turned them out on the far shore in their planned order. Once the machine has started nothing must stop it, otherwise chaos would reign. Communication with the contents of the machine—particularly individual units—is virtually impossible.

Alternatively, it might be suggested that in the planning stage the equipment should be phased into the shipping programme in a way that would ensure its arrival in advance of the personnel. This is most undesirable unless it is accompanied by a small advance party, for the following reason.

Clearance of stores from the docks must be rapid if the build-up programme of maintenance stocks is to be maintained. This means that maximum use must be made of all available transport and labour. If the equipment of a 1,200 bed hospital is unloaded at the docks prior to the arrival of the personnel, unaccompanied by even a small advance party, it is obvious that it has to be stored in either an Ordnance Depot or under arrangements made by the A.D.M.S. concerned. This is uneconomical as it involves a double "lift" and, therefore, more labour and more transport are required before the equipment can be delivered to its final destination. As the latter is merely 60 acres of open space, it is apparent that some personnel must be in situ if this very valuable equipment is to be safeguarded. Unguarded equipment has a peculiar habit of disappearing.

The implications caused by the delay in the arrival of G1098 equipment are many, and in Normandy they seriously interfered with the establishment of the later phased-in hospitals as well as interfering with those already established. The reception and transit camps on the far shore were intended to retain personnel for a maximum period of twenty-four hours. They had no accommodation for female personnel. As a result arrangements had to be made to accommodate the personnel in the hospital area, and so acute did this accommodation problem become that a complete 1,200 bed General Hospital was converted into an hotel for the personnel of General Hospitals awaiting the arrival of their equipment. The seriousness of such a situation cannot be over-emphasized for it can, and did, occur at a time when all were striving to get as many beds as possible established in the theatre in order

that a holding policy could be introduced. Unfortunately this situation was not fully visualized, and it was some time before it was possible to arrange for the nursing officers to travel independently on a hospital carrier. To circumvent this very real difficulty the following suggestions are put forward.

Where it is not possible for the personnel and the equipment to be shipped together, an advance party should accompany the stores which should be phased-in prior to the personnel. This advance party would accompany the equipment sent direct to the site allotted to the medical area in the Base. Where such a procedure is impracticable and stores ships, for example Coasters, cannot accommodate the personnel of an advance party, sufficient canvas and cooking equipment, taken from the G1098 of the unit, should accompany the personnel in order that they can be self-supporting on arrival. It must be remembered that sufficient transport to carry this equipment must be allotted by "Q." The nursing officers should not travel with the unit but should be called forward, independently, on a hospital carrier. This is a comparatively simple procedure for empty carriers are constantly returning to the scene of operations. In passing, however, it should be noted that the accommodation reserved for nursing officers prior to their embarkation should be within easy reach of the port from which the carriers sail—in any case, sufficiently close to avoid the necessity of "staging" overnight.

#### CONCLUSION.

An attempt has been made to record the major difficulties which occurred in the establishment of General Hospitals in Normandy. There were, of course, many others which individual units had to surmount, but these were largely due to circumstances peculiar to N.W. Europe and have not been included as it is to be hoped they are now of purely academic interest. Those mentioned in this article, however, are liable to be met in most theatres of operations, and if some of the suggestions made can help the lot of General Hospitals in any future campaign it is hoped those officers, nursing officers and O.R.s who did such excellent work, under very trying circumstances, in the medical base in Normandy, will feel that others may benefit by the experience gained from the difficulties they so cheerfully faced.

## THE SUBCUTANEOUS ADMINISTRATION OF PENICILLIN.

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THE intramuscular route is usually used for systemic penicillin therapy though according to the work of Rammelkamp and Keefer (1943) penicillin remains in the blood longer after subcutaneous administration. They found, however, that after subcutaneous injection it took a relatively long time to appear in the blood; in the two subjects investigated it was first detected in the serum in 85 and 115 minutes respectively after a single injection of 10,000 Oxford units. Also the serum did not attain as high a concentration of penicillin as it did when the intramuscular route was used. Bloomfield, Rantz, and Kirby (1944) also found that the serum concentration was lower after subcutaneous than after intramuscular administration, but reported the satisfactory treatment of gonorrhœa by continuous subcutaneous injection, and regarded the serum concentration of penicillin so attained as adequate for treating gonorrhœa and perhaps some other infections. All these workers used solutions containing the low penicillin concentration of from 100 to 200 units per ml. which may, perhaps, substantially account for the greater delay in its appearance, and for the lower concentration, in the serum after subcutaneous than after intramuscular injection.

In the early days of penicillin stronger solutions than those recorded above were purposely avoided for subcutaneous injection owing to the local painful reactions which they were apt to cause. As many of the purer preparations now available may, however, be given subcutaneously in concentrated solution without causing reactions it was decided to investigate the rate of transfer of penicillin into the blood, together with the concentration attained, when a solution containing 5,000 units per ml. was given subcutaneously in doses of 15,000 units, and to compare the rate of its disappearance from the blood when thus given with that after intramuscular administration. For this purpose 45 patients with gonorrhœa were treated, 13 receiving penicillin by intramuscular and 32 by subcutaneous injection. The penicillin was given at intervals of two and a half hours beginning at 7 a.m. and finishing at 10 p.m., 15,000 Oxford units being given at each of the first six injections and 10,000 units at the seventh, making a total of 100,000 units.

### METHOD OF INJECTION.

The injections were given with an ordinary hypodermic needle fitted to a Record syringe, and 1 ml. of the solution given contained 5,000 Oxford units of penicillin. There were no complaints from anyone receiving the subcutaneous injections, which were given into the abdominal wall, nor was there any tenderness at the site of injection though several patients were given all the injections at the same place.

### RATE OF TRANSFER OF PENICILLIN.

To test the rate of transfer of penicillin into the blood when given by subcutaneous injection 4 cases had the serum level of the drug tested thirty minutes after the first injection was given, 8 cases after fifteen minutes, 4 cases after ten minutes, and 10 cases after five minutes. The results are given in Table I. Serum bacteriostasis was estimated by a modified Oxford slide cell method and as the dilutions were not generally carried further than to 1 in 16 the

serum might, when this result is given, have been bacteriostatic in a higher dilution. All the sera taken five minutes after the first injection were found to show complete bacteriostasis

TABLE I.—SUBCUTANEOUS ADMINISTRATION OF 15,000 UNITS OF PENICILLIN.

Case No.	Interval between injection and collection of blood	Highest dilution of serum giving complete bacteriostasis
8	30 minutes	1 in 8
30	30 "	1 in 16
31	30 "	1 in 16
32	30 "	1 in 8
34	15 "	1 in 16
35	15 "	1 in 16
36	15 "	1 in 16
37	15 "	1 in 16
38	15 "	1 in 16
39	15 "	1 in 16
40	15 "	1 in 16
41	15 "	1 in 16
45	10 "	1 in 16
49	10 "	1 in 8
50	10 "	1 in 8
51	10 "	1 in 8
52	5 "	1 in 8
53	5 "	1 in 8
54	5 "	1 in 4
55	5 "	1 in 4
56	5 "	1 in 4
57	5 "	1 in 4
58	5 "	1 in 16
59	5 "	1 in 8
66	5 "	1 in 16
67	5 "	1 in 16

in a dilution of 1 in 4 or higher, while those taken ten to thirty minutes afterwards showed bacteriostasis in a dilution of 1 in 8 or higher, which proves not only that absorption from subcutaneous inoculation is sufficiently rapid when given as described but also that a satisfactory serum penicillin concentration is attained.

#### COMPARISON OF SUBCUTANEOUS AND INTRAMUSCULAR METHODS.

The next point to be determined was whether penicillin persists for a longer time in the blood after subcutaneous than after intramuscular injection. For this purpose blood was taken once only in each course of treatment, two and a half hours after the second injection, i.e. just before the third injection was given. The results are shown in Table II. Of 13 cases which received the penicillin by intramuscular injection 6 showed no evidence of it in the

TABLE II.—BACTERIOSTATIC POWER OF SERUM TWO AND A HALF HOURS AFTER INJECTION.

Highest dilution of serum giving complete bacteriostasis	Intramuscular	Subcutaneous
Nil	6 cases	2 cases
1 in 1	5 "	17 "
1 in 2	1 "	6 "
1 in 4	1 "	4 "
1 in 8	0 "	2 "
1 in 16	0 "	1 "
	13 cases	32 cases

serum at the end of two and a half hours whereas only 2 such cases occurred among the 32 men who were injected by the subcutaneous method. It seemed, therefore, that the latter

method gave a better chance of the penicillin remaining in the blood at the end of two and a half hours.

Case 13 is of interest. His serum showed full bacteriostasis in a dilution of 1 in 16 two and a half hours after penicillin was injected subcutaneously on July 5, 1944. On July 22, 1944, he was given the same course, but this time by intramuscular injection. His serum collected two and a half hours after an injection showed no bacteriostasis at 1/1.

#### FLUID INTAKE AND EXCRETION OF PENICILLIN.

It was next decided to determine if the amount of fluid taken by the patient during the course of treatment affected the bacteriostatic power of the serum sufficiently to make it advisable to control this factor. For this purpose 8 patients were treated in pairs in order that each pair would be subjected to the same conditions of temperature and have the same type of food. As far as was possible patients of similar weight and build were paired. During the fifteen hours of treatment one man was given 2 pints (1,136 ml.) of fluid, and the other 10 pints (5,680 ml.). After this the amounts were reversed so that the man who had drunk 2 pints during the day drank 10 pints during the night ending at 7 a.m., and vice versa. The total urine was collected in two lots; the day urine was that collected between 7 a.m., when the first injection was given, and midnight, this latter time being two hours after the last injection of penicillin when 10,000 units were given; the night urine was that collected between midnight and 7 o'clock the next morning. The amount of penicillin per ml. of urine was estimated by the agar cup method, and in this way the penicillin excreted in the urine was determined. The results are given in Table III.

TABLE III.

Experiment No., group, and weight of patient (lb.)	Urine passed during fifteen hours of treatment and subsequent two hours			Urine passed during subsequent seven hours			Percentage of penicillin given which was excreted in the urine
	Volume (ml.)	Penicillin (units per ml.)	Total penicillin (units)	Volume (ml.)	Penicillin (units per ml.)	Total penicillin (units)	
1 A (144) ..	4,540	20	90,800	780	4	3,120	94
R (134) ..	1,120	40	44,800	3,950	1	3,950	49
2 A (145) ..	3,050	15	45,750	1,130	3	3,390	49
R (158) ..	840	57	47,880	450	7	3,150	51
3 A (152) ..	5,370	12	64,440	325	10	3,250	68
R (151) ..	1,320	30	39,600	470	7	3,290	43
4 A (144) ..	4,400	15	66,000	315	22	6,930	73
R (134) ..	715	30	21,450	650	5	3,250	25

A = Abundant fluid intake (10 pints = 5,680 ml.) during fifteen hours of treatment; restricted fluid intake (2 pints = 1,136 ml.) during subsequent nine hours.

R = Restricted fluid intake (2 pints = 1,136 ml.) during fifteen hours of treatment; abundant fluid intake (10 pints = 5,680 ml.) during subsequent nine hours.

Three of the four men on restricted fluid intake during treatment excreted in the urine a much smaller percentage of the penicillin administered (average 39 per cent) than did their companions on abundant fluid intake (average 78 per cent). This suggests that restriction of fluids should be of value in retaining penicillin in the body, but titrations of penicillin in the serum two and a half hours after an injection showed no significant difference in the bacteriostatic titres of the sera of men in the two groups. The explanation may be that the retained penicillin is fairly rapidly destroyed in the body. It is improbable that more than a very small amount failed to be excreted during the period of observation. It is possible that the higher concentration of penicillin in the urines of men on restricted fluid may be of value in the treatment of gonorrhœa.

Patient 2 A differs from the other patients on abundant fluid intake. His excretion of urine was recorded as 3,050 ml. in seventeen hours during which his fluid intake was 5,680 ml. and 1,130 ml. during the subsequent seven hours with a fluid intake of 1,136 ml. His total excretion (4,180 ml.) is lower than that of any of the other three men in Group A which suggests that his intake was lower than it should have been or that some of his urine was not collected.

## CONCLUSION.

It is confirmed that penicillin may satisfactorily be given by subcutaneous injection, and it was found that when given thus in single doses of 15,000 units (5,000 units per ml. of solution) it was rapidly absorbed into the blood in satisfactory concentration. In doses of 15,000 units or less it would seem that the intervals between injections should not be more than two and a half hours; one of us (J. E. Schneider-Green) now gives a dose of 20,000 units-subcutaneously every two hours for the treatment of gonorrhœa with a total dosage of 100,000 units.

## SUMMARY.

The subcutaneous route is satisfactory for the intermittent administration of penicillin, and when given thus in doses of 15,000 units (5,000 units per ml. of solution) it appears rapidly and in satisfactory concentration in the serum, and seems to remain there slightly longer than after intramuscular injection.

Limitation of the fluid intake during treatment appears to reduce the amount of penicillin excreted in the urine, but not to increase the length of time during which the serum is bacteriostatic.

Our grateful thanks are due to Professor J. W. Bigger for his advice in the preparation of this paper, and to Private A. G. Smith, R.A.M.C., for his conscientious help in dealing with the treatment of the patients.

## REFERENCES.

- BLOOMFIELD, A. L., RANTZ, L. A., and KIRBY, W. M. M. (1944). The Clinical Use of Penicillin, *J.A.M.A.*, **124**, 627.  
RAMMELKAMP, C. H., and KEEFER, C. S. (1943). The Absorption, Excretion, and Distribution of Penicillin, *J. Clin. Invest.*, **22**, 425.

## THE MANAGEMENT OF CONVALESCENT SOLDIERS.

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### INTRODUCTION.

PERHAPS I take a biased view as the result of intimate association with Convalescent Depots for nearly a year, but there appears to be a wide divergence of views as to the functions and limitations of training and facilities that are available at Convalescent Depots.

Views vary from that which apparently considers that we possess properties akin to Lourdes, through the point of view that we provide a heaven-sent dumping ground for problems, to the impression that we provide a hardening school and are capable of restoring full military skill to the trained fighting soldier. In point of fact we possess no other attribute than the desire to produce the right answer coupled with a resigned acceptance of the problems sent to us for solution.

Other and more rational views as to our true function and capabilities are on the increase.

A Convalescent Depot attempts to restore a man physically and mentally for either a return to his full duties or for further military training. If the man's disability is such that he is considered unlikely to be fit for his old job we try to see that he is made as fit as possible for alternative military employment.

Our success or failure is dependent on various factors. These may be summarized briefly as follows :—

- (a) The arbitrary limitation which may be imposed by the original disability.
- (b) The response to convalescent treatment.
- (c) The man's outlook towards the future, his disability, and to the Army as a whole, i.e. his mental reaction to his disability.
- (d) The degree of desocialization and regression that has occurred as a result of the disability and hospitalization.

All these factors must be assessed in any and every patient when he is received at a Convalescent Depot.

It will be seen, therefore, that the planning of controlled recovery for any patient can be divided into two parts. These are :—

- (1) The purely physiological and physical side, i.e. the restoration of function.
- (2) The psychological and mental side, i.e. his resocialization to the group, his readjustment to his former environment and restoration of mental well-being.

The one cannot be fully accomplished without the other. A balance must be struck and recovery controlled and implemented accordingly. A healthy body is always dependent on a healthy mind. The converse does not always obtain. It is proposed to deal with each side of recovery separately ; to try and give some idea of the methods employed, and the resources available, for the planning of recovery in its widest sense from wounds or sickness in the soldier. It is hoped by so doing that a truer appreciation of the problems attendant upon convalescence will be obtained by those whose duty it is to know them, and that better use will therefore be made of that frequently misunderstood handmaiden of the medical services—the Convalescent Depot.

### THE PHYSICAL SIDE OF RECOVERY.

The methods of rehabilitation vary according to the individual opinions and experience of Convalescent Depot Commanding Officers, but basically they all entail :—

(a) Preliminary examination and sorting into various physical grades subject to the general assessment given above. The grades are generally I, II, III, and IV, I being the lowest and the least strenuous while the others increase progressively.

(b) The provision of a suitable regime for each grade.

(c) The observation and control of physical progress and response to treatment.

It must be clearly stated at the outset that there is not the slightest necessity for patients to progress through all four grades before they can be considered fit for discharge. In this Depot it is the exception rather than the rule for this to happen since it is considered that if a man is fit for the most strenuous grade he is fit for return to work. The decision as to fitness rests entirely with the medical officers. Much of course depends upon the man's military employment and his medical category on admission. Furthermore, it is not considered essential for every patient to start in the bottom physical grade. Many are perfectly fit for work after a week in the second or third grade. With these points clearly outlined it is now considered that an outline of the classification of the patients for an appropriate convalescent regime can be given.

### CLASSIFICATION INTO PHYSICAL GRADES.

All patients are examined on intake and, dependent upon their degree of physical or psychological disability, length of time in bed in hospital, medical history, specialists' recommendations and the general impression they give, are placed in one of the four grades (I-IV).

*Grade I* is the lightest and tends to receive the majority of patients for reasons that will become obvious.

Generally speaking, cases considered to require remedial exercises, physiotherapy, prolonged dressings, cases in leg P.P.S. or who have had an abdominal operation (herniotomy, appendicectomy, etc.) along with those who have suffered from debilitating medical diseases, e.g. diphtheria, pneumonia, infective hepatitis, etc., are placed in Grade I.

This grade receives very light physical training, walks (if disability permits) and specific remedial treatment. Certain cases may be given very light sedentary employment. Similar types of cases, e.g. diphtheria, battle exhaustion, etc., are grouped into special classes and their exercise carefully controlled. Pulse checks, for example, are kept on all diphtheria cases, observations being taken before, during and at the conclusion of exercises and progress is regulated accordingly.

*Grade II* represents a slight physical increase on Grade I. The General P.T. is a little more searching. Cases in this group also continue remedial treatment if necessary. A proportion of patients can be put into this grade straightaway on admission, e.g. healed wounds with nothing more than a residual stiffness of related joints and muscles due to disuse, mild respiratory infections, fractured scaphoids in arm, P.P.S., fibrositis, etc. Walks and light employment are continued.

*Grades III and IV* are a further physical progression and the P.T. tables used are normal tables for trained soldiers, these being firmly pushed in Grade IV.

Route marches are introduced at this stage along with periods of elementary squad drill common to all arms.

Patients in these grades are available for the heavier fatigues such as ration humping, coal fatigue, wood chopping, road making, etc., all of which are essential in any Depot.

No patient in these grades does any remedial training. He is considered at this stage to require it no longer.

These grades will also include those who have completed their remedial and physiotherapeutic treatment and whose response to more vigorous exercise must now be assessed before final fitness for discharge is decided, e.g. the knee injury that has advanced from



remedial treatment to improve quadriceps tone through progressive weight bearing without recurrence of effusion and which must now be tested out.

All four grades, regardless of disability, receive recreational training of a suitable type. This varies from hand football, basket ball, shinty, etc., up to full scale football matches on an inter-company basis. No case with a knee injury is, however, permitted to play football.

Bad weather in the winter months tends to restrict these activities as may the lack of large gymnasium facilities. Classes are given games under cover as far as possible and it is astounding the variety of small type indoor games there are that are capable of combining bodily exercise with amusement. "Brains trusts" on sporting and athletic subjects and sports quizzes are also held when outdoor training is impossible.

#### TREATMENT.

The above give in outline the general system which provides the basis for progressive recovery of physical function. It is considered essential, however, that certain other aspects of it should receive more detailed explanation. These aspects are concerned with particulars of the therapeutic side and it is hoped they will give some idea of the facilities that are available in the average Convalescent Depot.

#### *Remedial Treatment.*

Patients who are considered to require more specialized attention are, as has been pointed out, retained in the lower grades. In this Depot remedial treatment is of two types :

- (a) Special Remedial Treatment.
- (b) General or Class Remedial Treatment.

The significance of each is explained below :

(a) *Special Remedial Treatment.*—This group includes the patient whose disability is such that it is considered to warrant concentrated attention and who is unable to take his place in one of the more general classes. Such cases will include the lower limb fracture just out of P.P.S. with reactionary oedema round the joints and considerable stiffness ; traumatic synovitis or internal derangements of the knee in their early stages with considerable residual effusion which are considered not yet ready for extensive weight bearing ; cases with extensive muscle wasting or limitation of joint movements following prolonged immobilization ; cases of fibrositis, adherent wound scars, and so on, are all given special remedial exercises designed to help them to overcome their disability. This group includes the type of case that justifies the use of apparatus to assist voluntary effort, e.g. ropes, pulleys, and graduated weights for progressive muscle re-education against gravity, devices for quadriceps drill, etc.

It is in this group that patients are re-educated in movements that are long forgotten either through prolonged immobilization or loss of confidence. It is surprising the number of cases that have to be taught afresh to walk properly. Here too will be the post-diphtheritis whose treatment requires careful individual attention which cannot be given in a large class.

As far as possible cases on special remedial exercises are grouped by disabilities. This department requires the services of two full-time P.T.I.s who do nothing else. These instructors have received special training in this type of work.

(b) *General Remedial Treatment.*—This is carried out on a definite class basis. There are classes for abdominal cases, arm and shoulder disabilities, foot and ankle disabilities, leg cases, knee cases, classes for patients who must be re-educated in the mechanics of respiration following respiratory disease, and classes for faulty posture.

There are specific exercises for each group of cases and all these exercises are progressive in character.

The general remedial classes cater for those patients with regional disabilities which do not require concentrated attention but which require more specialized local attention than can be obtained in general P.T. tables.

All P.T.I.s are trained in this and each has his own particular groups. Instructors are changed round periodically to overcome staleness.

The exercises given are, generally speaking, those outlined in the Handbook of Physical Medicine Remedial Exercises for the use of A.P.T.C. Instructors, 1943. This is an excellent pamphlet and deserves much wider appreciation than it gets.

(c) It must be clearly realized, however, that all patients who are receiving remedial treatment whether special or general always have their specialized remedial exercises preceded by a light general P.T. table performed up to the limit imposed by their disability together with games and quickeners to keep them mentally alert. No patient is permitted to concentrate all the time on his specific disability.

#### *Physiotherapy.*

Patients who are considered to require such treatment as radiant heat, infra-red, U.V.L., massage and electrical treatment are retained in Grades I and II until the need no longer exists. At no time does any patient receive this type of passive treatment to the exclusion of all other forms of active remedial treatment. The two are naturally complementary and are run concurrently.

Cases of fibrositis, back-ache and similar conditions which have frequently received extensive physiotherapeutic treatment during a prolonged stay in hospital are not unknown in this Depot. Such cases are, if it is humanly and humanely possible, kept out of the physiotherapy department altogether, and class exercises with a manipulative flavour prescribed and executed instead. In any case those who receive physiotherapy do the exercises as well.

It is quite amazing the amount of faulty posture and abnormal gait which is due to an hysterical element that is seen in such cases. It is equally satisfactory to see the improvement which can be effected with *active* exercises and firm handling.

The average Convalescent Depot is in a position to carry out considerable physiotherapeutic treatment. It is, however, limited by the small establishment of physiotherapists.

#### *Medical Treatment.*

The statement contained in R.A.M.C. Training Pamphlet No. 2 to the effect that Convalescent Depots require little medical personnel and equipment must be taken with reserve. The number of dressings we are expected to carry out is high and there exists the need to run a detained ward of at least ten beds in a Depot of this size. Day-to-day trauma and minor sickness must be catered for in addition.

#### *Orthopædic Facilities.*

Every case admitted in P.P.S. for limb fracture and any other type of orthopædic case about whose response to treatment or disposal we are at all uncertain is seen weekly by a visiting orthopædic specialist. This specialist controls the removal, re-X-ray and the application of fresh P.P.S. when necessary. He furthermore gives us the benefit of his technical knowledge in connexion with the correct disposal of patients. It may not be out of place to call attention again to the fact that all cases in limb plaster are given general exercises up to the limit of their disability and are encouraged to be as active as possible.

#### *Review and Progression of Patients.*

Every patient is seen weekly by his medical officer and his physical progress towards recovery is reviewed. Patients on remedial exercises are reviewed separately at the same interval.

At such reviews all the cases are put through a simple P.T. table designed to test out each part of the body and which will expose any weakness. At any time during the training of their grade P.T.I.s can, and do, bring to the notice of medical officers those who fail consistently in any one part of their P.T. table because of their disability. It is not unknown for such training

to bring to light some hitherto unsuspected disability which may be quite apart from the original condition for which the patient was sent to the Convalescent Depot. Such a check on progress rarely fails to reveal those whose slow recovery is due to lack of voluntary effort. Occasionally the reason for failure to improve physically may be due to no apparent cause, in which case the whole problem presented by that individual is reviewed afresh and alternative methods adopted or fresh investigations initiated. On these weekly reviews, according to the patient's response to treatment and his general progress, the medical officer may put his patient up a grade to test his response—this is nearly always the case in knees which have completed remedial treatment—he may mark a patient as fit for discharge, or a patient may be referred back for further specialist opinion or a medical board for the lowering of his category.

No patient is medically boarded into a lower physical category until every effort has been made to see if this can be avoided.

#### *General.*

It will be observed that the progress of each individual patient is watched as closely as possible and those who have been on remedial treatment generally finish their training with a period of general P.T. Certain cases, however, are selected for suitable employment of a type which ensures fresh air and exercise in preference to a set course of physical training. This group will include men of 40 years of age and upwards who are admitted after mild medical and surgical conditions, e.g. uncomplicated tonsillitis or uncomplicated hæmorrhoids. Such patients carry out jobs like groundsman, general handy man for P.T. staff, etc., during their stay. Physical training is not, when all is said and done, to be regarded as a basic essential for full recovery.

Yet another group of patients will be given employment as clerks, cinema operators librarians, etc., while they attend regularly for specific remedial exercises and physiotherapy.

Cases of the type quoted are given a nominal grade, attend for weekly review, and are discharged when considered ready.

#### SUMMARY OF THE PHYSICAL SIDE.

It will have been seen from the foregoing the efforts that are entailed in dealing on a systematic basis with the purely physical side of recovery of a large group of men suffering from the after-effects of a variety of conditions. It will be appreciated that something more than a mere rule of thumb application of physical training is involved. What Convalescent Depots attempt to do is to restore physical function up to the point where a return to original work or the absorption of specialized military training from experts becomes possible. In no sense do we attempt to effect the final hardening process.

The omission of any reference to assault or obstacle courses in this phase of recovery will doubtless have been noticed by some. This is deliberate. It may even be considered provocative.

Assault or obstacle courses of ingenuity and complexity and, it may be added, of definite risk value, are considered to have no place in the physical regime to be adopted by Convalescent Depots. Normal P.T. with the provision of a few *simple* obstacles of the type which are calculated to improve muscular co-ordination and to increase the confidence of an individual in himself are considered to be quite sufficient. If it is considered that a patient is fit enough to carry out a circuit of an elaborate and spectacular assault course or successfully to accomplish a test forced march, he is quite fit enough to be returned to his unit, or to undergo the hazards of further military training and circumstance.

Furthermore, the military employment of many soldiers is such as not to necessitate such a drastic degree of hardening, neither does their original medical category demand such assurances of fitness.

These comments are not based on speculation but on observation of the type of training adopted at a variety of Convalescent Depots and on personal experience in attempting to evolve the most satisfactory system.

As a further guide to those whose knowledge of the functions and capabilities of Convalescent Depots is somewhat speculative it is not considered out of place to point out various other general facts which are best placed in the summary of the physical approach to recovery.

Every patient on admission is dentally inspected and any outstanding treatment—including the provision or repair of dentures—completed before he is discharged. In addition his inoculation state is checked and he is brought up to date.

Cases sent to Convalescent Depots must be able to fend for themselves as far as the basic functions of day-to-day existence are concerned, e.g. although their power of locomotion may be limited they must be able to feed, dress and wash themselves. Convalescent Depots are *not* in a position to provide special diets, nor have they facilities for retaining cases in bed under anything like hospital conditions. As has been mentioned previously our "detained ward" caters for the day-to-day minor illnesses and trauma only and our range of medical equipment is not elaborate.

#### PSYCHOLOGICAL AND MENTAL SIDE OF RECOVERY.

When the problem of recovery is considered it becomes obvious that there are other factors involved besides the process of restoration of physiological function. Indeed, in certain instances physiological recovery cannot be fully restored unless such factors are taken into consideration.

Full recovery, in addition to restoration of function, entails for everyone a process of resocialization and readjustment to a particular group and environment; it entails a halting or reversal of the psychological regression caused by physical disability; and finally the restoration, as far as possible, of individual skill.

Any soldier who has been removed from the continuous military influence to which he is subjected in his unit in the field presents a problem in reconditioning and readjustment. Basic military conditioning tends to fade with varying rapidity on removal to hospital. This is not surprising in a war when it is realized that, for so many, the Army represents a purely temporary environment to which they are subjected by the dictates of necessity rather than their own free will. The ingrained and firmly established conditioning of former civilian circumstances is easily reawakened and becomes prominent during the period of regression and self-absorption that accompanies wounds or sickness. The set of military "conditioned reflexes," for want of a better term, tend to be overpowered by their civilian counterparts.

The seasoned soldier of several campaigns drawn from units with high tradition and group morale presents the least difficulty in resocialization. In his case the loosening of these temporary ties is much less since a higher degree of conditioning has been attained as a result of several years of war. This degree of loosening steadily increases with the diminishing years of service until we reach the unwilling conscript in an L. of C. billet and the most recent intake in whom conditioning has scarcely been established and upon whom the effect of his new environment is to produce frightened bewilderment or resentment at what he considers to be irksome restraints.

There are other factors which must be taken into consideration as having a direct bearing on full recovery in the military sense and which affect to a greater or lesser degree its successful, easy and rapid accomplishment. These may be summarized briefly as follows:—

(i) The essentially labile nature of military environment. Few other aggregations of life's circumstances can provide the same degree of contrast as can those of an army at war. They vary from those which are utterly unpleasant and which present a constant threat to continuation of actual existence to the completely safe and "cushy." This fact in itself does not make for ease of readjustment. Furthermore, the degree of physical recovery attained has a direct relationship. The continuation of somatic signs of disability may be due in part, in certain types of individuals, to the knowledge of what lies ahead of them on full recovery.

(ii) The stresses and strains imposed by the inevitable and prolonged separation from home and family.

The resultant worries of finance, infidelity, lack of news, anxiety due to exposure of

dependants to danger on the Home Front (V.1, V.2, etc.) will all have a bearing on the recovery of an individual. Illness and injury cause regression and self-absorption. Domestic worries as a result tend to be magnified until the patient's mind is occupied with them to the exclusion of all else. This may manifest itself in a continuance of somatic signs, lack of the voluntary efforts so essential to the physical side of recovery, or in frank resentment of an environment which is considered responsible for a series of disasters, to which he feels he owes no loyalty and to which he has no wish to return.

Such possible causes of prolonged recovery time must always receive consideration.

(iii) The instincts of fear and self-preservation and the possible development of conversion symptoms in certain types of soldiers.

It is given to relatively few in modern armies to be in continued and constant danger of losing their lives. Nevertheless, amongst those who are so placed the forces capable of being excited by these primitive and powerful instincts must be recognized when recovery is delayed and there is a continuance of signs and symptoms for no apparent clinical reason.

There may be definite signs of anxiety with or without conversion symptoms. Unless care is taken long and pointless remedial exercises may be prescribed and there is a definite risk of concentration on the physical side with the risk of further fixation of conversion symptoms.

It is not easy in the comparatively sheltered existence of hospitals and convalescent depots to realize the fear that may be the constant companion of a patient's existence when he is whole. Nevertheless, it would be foolish to deny its presence. Under such circumstances blind adherence to a physical routine can accomplish nothing of value.

I do not wish it to be understood that such manifestations of these instincts present mass problems in recovery. They do not. But it is maintained that the realization that such manifestations do exist is an essential if recovery is to be hastened on a controlled and reasonably scientific basis which is an essential in any organization which needs man-power.

I do not include under this heading the reactions to disability and to ordinary Army existence of those with neurotic history and tendencies. This problem is always with us in Convalescent Depots. In such cases a breakdown may be precipitated by circumstances of battle but, generally speaking, it will manifest itself sooner or later whatever the circumstances.

(iv) Disability or sickness in the Army does not as a rule involve a loss of earning power as it does in civil life.

It may be argued that such a state of affairs removes one of the biggest incentives for recovery. It would be inadvisable, however, to advocate any alteration in a system which makes this possible. It would give rise to gross inequalities and no man who has been injured in the service of his country should be penalized. Nevertheless, this factor is considered to have a direct bearing on the length of recovery time and is mentioned for this reason.

With all these diverse factors having an effect to a greater or lesser extent on the successful accomplishment of a physiological process the task that faces any unit concerned with recovery is complicated to say the least of it.

It becomes essential to ensure that each patient is regarded as an individual problem and at the same time to find a common denominator of the means to effect military resocialization and readjustment in an immense variety of men from an enormous variety of units.

The former is accomplished purely and simply by observation and the realization of the factors involved in full recovery as they affect the individual. No set method can be laid down. Suffice it to say that medical officers, welfare officers and psychiatrists can be and are intimately concerned.

With regard to the latter, Convalescent Depots as they are constituted to-day cannot find this common denominator in purely technical military training. Their staffs are insufficiently experienced in modern weapons and combat methods to provide technical training of any value and, furthermore, every patient who comes to a Convalescent Depot does not require such training. It may be argued that arms should be provided and suitable instructors found from patients. At the best this is considered to be a makeshift method and satisfactory

continuity of instruction is impossible unless the instructors are retained indefinitely, which is highly undesirable. Compromise is impossible. I have seen attempts to carry out such training and results are disappointing. A false atmosphere rapidly develops which does more harm than good and such methods fail in their object. The seasoned fighting man is apt to be contemptuous of such methods; the average man on L. of C. employment does not require them; while the unconditioned youthful reinforcement gains nothing to restore confidence in himself or his weapons. Such methods *must* be left to experts. It is considered that to look for the common denominator for military resocialization among such methods is unsatisfactory and that other methods should be employed which are capable of application to any and every soldier whatever his unit or trade.

It is considered that the methods to be employed should have two objects in view :

(i) The lifting of the soldier out of his self-absorption and regression back into a *military* community.

(ii) The re-establishment of the *basic* elements of military conditioning, as opposed to the purely technical side which is best left to military experts.

The former provides a basis for theoretical instruction while the latter represents its practical reinforcement. If such principles are adopted they enable a balanced programme for readjustment and resocialization to be constructed which will march concurrently with the physical regime already outlined. Furthermore, it enables the best use to be made of available resources without the introduction of an atmosphere of what can only be described as "failed militarism."

The methods adopted to effect each of these requirements will be briefly outlined :—

(a) No soldier is permitted to concentrate on himself or his disability to the exclusion of everything else. He is encouraged to think outside himself in terms of the community and his responsibilities towards it. The term community is taken to embrace the world to which he belongs and the Army of which he is a member. An attempt is made to remind him that he has a duty towards both. Every patient therefore receives set periods of theoretical instruction along the following lines :

(i) The war with its many angles and its diverse implications is discussed. The presence of other theatres of war and other Allies is stressed. He is encouraged to take part in these discussions and many of the discussion groups are conducted by patients for patients. (A.B.C.A. A.F.C. personnel. B.B.C. news bulletins. News sheets.)

(ii) He is encouraged to discuss the future development of his own country and community with its industries and government. He is gently reminded of his responsibilities as a citizen as well as a soldier. He is invited to air his views about his own particular trade or job in relation to the whole. The importance of his vote and his duties in this connexion are stressed. (British Way and Purpose. A.F.B. 2626 and A.E.C. personnel.)

(iii) He is taught something of the way an army is fed. The significance of various items of his ration is explained, and he is given a few logistics about supply, shipping space, and the maintenance in food of an army in the field. (A.C.C. Specialist Messing Officer. Training films.)

(iv) He is told how the Army pays him, the system upon which it works, how the paymaster can help him and his dependants and the importance of observing a few simple rules to ensure that things do not go wrong. (Admin. Officer for Pay Duties.)

(v) He is reminded of the significance of routine. He is told the reason for orders, rules and regulations and what is expected of him in their observance. N.C.O.s are reminded of their responsibilities towards the Army as a whole, *not* just to their own unit. (Adjutant. Admin. Officers.)

(vi) He is told about the physical processes involved in his recovery, and about the care of his body and its importance as a national asset in time of war. (O.s.C. Divisions. Training films.)

It is considered that the foregoing provide a theoretical basis for readjustment and serve to arouse the soldier's mind, and to remind him once more that he is part of a highly organized

community. This system also acts as a preliminary for the more active methods employed to speed readjustment. These active methods are outlined below.

(b) Active reinforcement of the foregoing theoretical preparation entails the realization that we must build our methods up on the following lines :—

- (i) The necessity for the resumption of responsibility.
- (ii) The need to work for community requirements.
- (iii) The need for conforming to a pattern of existence, and to live within established scales and rules which have been evolved over a period of many years for the mutual advantage, protection and well-being of any military community.
- (iv) The need for the recognition of the environmental contrast which is an inevitable component of military existence in war.

It may be argued that anything mentioned so far is covered by the term "Discipline." This is an overworked word and is too frequently used in connexion with convalescent soldiers without any clear indication of what it entails. Discipline is, after all, the outward manifestation and response to a process of mental conditioning. In a citizen army in the sixth year of the war such conditioning cannot be attained by physical methods alone in convalescent soldiers nor does purely technical military training provide the answer. The process must be taken apart and analysed on the lines given above, when it will be seen that "discipline" becomes the affair of the medical officer, the welfare officer, the psychiatrist, and the education services, supported by the parade ground, the drill serjeant, the orderly room, and the P.T. staff. The situation cannot be reversed.

Patients with trivial disabilities who have recovered after a very short stay in hospital should not be sent to Convalescent Depots merely for "discipline." Such a thing is a manifestation of loose thinking about the problem of recovery or else is done for administrative convenience. The necessary reinforcement of conditioning is best accomplished in the patient's unit in such cases.

Assuming, however, that such cases are not received and only those whose recovery presents a well-defined problem are sent to a Convalescent Depot, what are the best means to employ to reintroduce or reinforce basic military conditioning? It is considered that the four headings given above provide a basis upon which to work out the problem and their application is discussed below.

*The Necessity for the Reassumption of Responsibility.*—The basic organization of this Depot divides each company of convalescents into platoons by physical grades. N.C.O. patients in each platoon are expected to perform the duties of platoon serjeant (disability permitting) and as such they are held responsible to Company Serjeant Majors and through them to O.C. Division for the performance of various duties such as ensuring the attendance of their platoon for training, medical or dental treatment, the cleanliness of platoon accommodation and the behaviour of their platoon. Furthermore, other N.C.O.s are expected to do duties as Company Orderly Serjeant, N.C.O. i/c Guards and Fire Piquets and fatigue parties, etc. The list could be continued indefinitely but the underlying idea is always constant. It is to teach that the burden of responsibility laid down in hospital—sometimes all too readily—is a burden that must be picked up if the Army is to continue. It is not an easy idea to instil since so many inevitably feel that there is no need for even a temporary loyalty towards an organization such as a Convalescent Depot. Fatigue parties are observed to have a low work output in relation to their strength; squads for lectures mysteriously go astray and fail to turn up at the rendezvous; patients attend for a simple dressing and vanish like the smoke of the quiet cigarette they are enjoying somewhere safe from the instructor's eye, and so on. The effort must be made along these lines and in general it can be said to work.

*The Need to Work for Community Requirements.*—This may sound a little high flown as a definition of the idea underlying duties such as "spud bashing," drawing coal for companies, unloading rations, cleaning dining-halls, serving meals, being on guard, fire piquet,

telephone duties, cleaning up the cinema and all the other essentials of service required in a military community. Nevertheless, these duties are expected and done by patients as part of their resocialization and readjustment.

It is astounding how selfish injury or illness can make an individual and how preoccupied with his own personal well-being he can become, generally at the expense of his fellows. It is inevitable to a greater or lesser degree but it is not permissible in a military community and men must be made aware of this.

For a man to eat two dinners someone must go short. If insufficient potatoes are peeled, again their fellows suffer. An army cannot survive on an individualistic basis. This must be retaught since in hospital it tends to be forgotten. The above are some of the methods we apply and they are an integral part of military convalescence.

*The Need for Conforming to a Pattern of Existence, etc.*—During and for some time after wounds and sickness there is a tendency for the afflicted individual to feel that the whole military system is designed for his personal inconvenience. Recovery from the psychological regression induced by bodily affliction has, as one of its earlier signs, the criticism of this pattern and system. Such criticism is in itself a healthy sign, but presents a problem in resocialization since if carried to the length of active expression it tends to result in military offences of the anti-group type, e.g. absence, appropriation ("winning") of kit, lack of care in personal appearance (long hair, failure to keep clothing in good repair, etc.) and disrespect towards N.C.O.s or towards the other outward signs of the authority of the system. The list is not long, but it must receive consideration when convalescent regime is being constructed. Accordingly, blankets, bedding, utensils, and billets must be laid out to a set pattern for inspection at regular intervals, regular clothing exchanges are run as parades, a system of bounds, passes and time limits introduced and set periods of basic squad drill and turn out inspections are inserted into the training programme, along with the formal mounting and inspection of guards and piquets, in order to help restore the basic pattern of military existence.

*The Need for the Recognition of the Environmental Contrast which is a Normal Part of a Military Existence in War.*—In this Depot, patients live under conditions which, although presenting a marked contrast from the haven of white sheets and comfort prevailing in hospital, are still comfortable enough to remind them of discomforts which may lie ahead. They are housed in buildings. They have double bunk wooden beds, mattresses and blankets, but no sheets. Fires cannot be lit until a certain time each day which is dictated by the availability of fuel (a circumstance not unknown in the field).

They feed on a community basis and are no longer waited upon. The quantity of potatoes they receive depends directly on their own "spud bashing" output. They wash up their own plates and eating utensils. They clean out their own quarters and sanitary annexes. They light their own fires and do their own personal laundry. Throughout the day they are kept occupied and, as far as possible, on the move in the open air. Deck-chair convalescence is not permitted nor is it practicable.

In no sense can Convalescent Depots be regarded as the equivalent of convalescent homes where attractive V.A.D.s, easy chairs, beds with sheets, rooms with pretty chintzes and every creature comfort prevail. They are not. So it is unfair to tell patients discharged to a Convalescent Depot that they will be treated along these lines. They are not. It is the task of a Convalescent Depot to prepare soldiers, physically and psychologically, for the plunge back into the cold douche of military group existence, and that task is hampered and the soldier's recovery time prolonged if they arrive with such ideas. Canteens, library, radio sets and newspapers are all available to soften the blow. E.N.S.A. and cinema shows are given regularly. "House" and whist drives are part of leisure hours. Over and above all there are regular hot meals, security from enemy action on all but the rarest occasions, buildings which replace the foxhole and mattresses which replace mother earth. There are hot baths. There is even a barber's shop. Boots can be mended and clothing exchanged.



But conditions, regime and training are founded on the necessity for an early resocialization to the military community as a whole and for a speedy readjustment to an environment of a varying degree of danger and discomfort. They are designed to remove individual self-absorption in disability. Of necessity the softer shades of existence must be less in evidence.

#### SUMMARY OF THE PSYCHOLOGICAL AND MENTAL SIDE.

It will be seen that the problems attached to the provision of a suitable regime to cater for the psychological needs of full recovery are as complex as those entailed in catering for the purely physical side. They are, however, infinitely less measurable and are governed by a number of variables all of which can be reflected in a patient's physical progress.

Nevertheless, it is felt that a training programme which is based on the principles I have mentioned will provide the optimum means of resocialization and readjustment for the maximum number in any group of convalescent soldiers with varying physical reactions, a wide variety of disabilities and drawn from nearly every unit in the Army.

#### SUMMARY AND CONCLUSIONS.

(1) An attempt has been made to outline the principles upon which it is felt that the recovery of the soldier from wounds and sickness should be planned and controlled.

It is upon these principles that the training programmes for *each* physical grade and the regime of living for *all* grades are constructed in this Depot. It has not been considered necessary to cumber these notes with specimen training programmes or details of the administrative methods employed.

(2) Recovery in the soldier presents psychosomatic problems which cannot be solved within the narrow bounds of graduated exercises.

(3) It is suggested that the Convalescent Depot is not entirely suitable to carry out technical military training with the objects of the restoration of original military skill and of effecting readjustment to the military environment. It is considered that this lies within the province of experts.

(4) It should be realized that a Convalescent Depot is not a "hardening" unit pure and simple nor is it analogous to a Convalescent HOME. A Convalescent Depot should not be regarded as an organization for the reinstallation of "discipline" in patients whose trivial complaints have resolved completely after a very short stay in hospital nor should it be regarded as a convenient means of disposal of "patients" of the type with which we are all familiar merely as a last resource.

(5) It is hoped that these notes will serve to clear up any misapprehensions which may exist as to the true function, resources, methods, and limitations of the Convalescent Depots in a theatre of war. It is only by wider appreciation of these facts that they can pay the big dividends of fit and useful soldiers that are an essential to an army at war.

#### ACKNOWLEDGMENT.

I wish to express my gratitude to the members of the staff of the Convalescent Depot I command, for without their help these principles could not have been put into successful practice.

#### REFERENCES.

- R.A.M.C. Training Pamphlet No. 2. 1943.  
Physical Medicine Remedial Exercises for A.P.T.C. Instructors. 1943.

## CULTURE METHODS IN THE DIAGNOSIS OF AMŒBIASIS.

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*Entamoeba histolytica* was first successfully cultivated in an artificial medium by Boeck and Drbohlav (1925). St. John (1926) drew attention to the value of culture of the organism in the diagnosis of amœbiasis, and Craig and St. John (1927) found that culture of fæces for *E. histolytica* gave a higher percentage of positive results than was obtained either by direct examination or by examination after concentration where one specimen only was examined. In a series of 71 cases *E. histolytica* was obtained in culture in 11 cases, while direct microscopical examination and examination after concentration gave positive results in 6 cases and 9 cases respectively.

A negative result from the examination of one specimen of fæces is, of course, insufficient evidence on which to exclude a diagnosis of amœbiasis. A series of six to seven specimens is required before reasonable assurance can be given that amœbæ are absent from the stools. The purpose of the investigation to be described was to determine of what value culture of fæces for *E. histolytica* might prove when employed as a routine measure in a military hospital laboratory. That is to say, would culture for amœbæ prove an effective alternative to the examination of the long series of specimens required from each case of suspected amœbiasis?

In this context it is appropriate to note the conditions in which laboratories situated in endemic amœbiasis areas function. Though the actual ratio of amœbic to bacillary dysentery may be low, comparatively, and though perhaps these two diseases may not account for a very large proportion of the total number of medical cases in the wards, yet the number of stools sent to the laboratory for examination for amœbæ forms a very considerable proportion of all specimens received. This is due to the fact that a series of stools is required from each patient in whom amœbiasis is suspected, as has already been mentioned, and amœbiasis is always in the mind of the physician who works in an endemic area, as indeed it must be, when he examines patients complaining of a variety of symptoms, apart altogether from those who give typical histories. Furthermore, each patient who has been treated for amœbiasis undergoes tests of cure. These involve the examination of another series of specimens from each case.

The staff available to deal with this large number of specimens is usually inadequate. Though this cannot be rectified in these days of acute shortage of man-power, it does mean that the time given to the examination of a specimen of fæces depends on the total number of specimens to be disposed of and the pressure of other work. Thus less time is devoted to the examination of each specimen than is desirable. It will be readily appreciated, therefore, that any method of diagnosis of amœbic infection which would obviate to some extent the usual lengthy examinations would relieve a busy laboratory of much routine work.

The point need not be further laboured. It will be appreciated at once by any who have worked in laboratories in endemic areas. Though the results now to be presented form only a small series—the writer returning to this country before completion of the investigation—it is felt that their publication might be of interest, and possibly of some help, to those whose duties still bring them into contact with numerous cases of amœbiasis.

## TECHNICAL METHODS.

*The Medium.*—The original medium of Boeck and Drbohlav (1925) consisted essentially of inspissated egg and Locke's solution, the slopes being covered with a mixture of Locke's solution inactivated human serum. Dobell and Laidlaw (1926) modified the method, using slopes of inspissated horse serum covered with egg albumen solution. A small amount of rice starch added to the solution gave a more luxuriant growth of amœbæ. Simpler media have also been devised. Craig (1934) reports favourably on a medium consisting of one part of inactivated human serum and seven parts of 0.85 per cent saline, the mixture being sterilized

by filtration. In the present investigation an altered version of Dobell and Laidlaw's method was used, the medium being prepared as follows :—

- (1) Loeffler's serum slopes : These are made from ox serum in the usual manner.
- (2) Ringer's solution :

Sodium chloride	..	..	6.0 grammes
Potassium chloride	..	..	0.5 „
Calcium chloride	..	..	0.1 „
Sodium bicarbonate	..	..	0.1 „
Distilled water	..	..	1,000 c.c.

Autoclaved at 15 pounds for twenty minutes.

(3) Egg albumen : Two new-laid eggs are thoroughly cleansed with soap and water and with spirit. The shells are punctured and the egg white run into a sterile vessel. This is well beaten up and is then added to the Ringer's solution. Sufficient of this Ringer-egg solution is now added to each Loeffler's slope to reach the top of the solid medium. The tubes are tested for sterility in the incubator, where they may be stored.

(4) Rice starch : A few grammes of rice are triturated in a mortar till a fine powder results. This is sterilized in the hot-air oven at 160° C. for twenty minutes. Before the medium is used a knife-point of the rice is added to each tube employed.

*Inoculation.*—Failure results if the methods normally employed in bacteriological technique are used. *Amœbæ* are never present in the fæces in numbers comparable to the number of micro-organisms in, say, a specimen of pus, or to the number of dysentery bacilli in the stool from a case of bacillary dysentery. For this reason the amount of material conveyed by a platinum loop is insufficient as an inoculum when *amœbæ* have to be cultured.

If the stool is solid or semi-solid, a portion about the size of a pea is introduced into the culture tube and gently rubbed up in the fluid, the medium having previously been warmed to 37° C. If the specimen is fluid, at least 0.1 c.c. should be added with a sterile pipette. The tube is then incubated at 37° C.

*Examination of Cultures.*—Here again, the usual bacteriological methods cannot be used. At least 0.1 c.c. of material should be removed for examination. This is effected by drawing up the sediment at the bottom of the slope with a sterile capillary pipette, at the same time gently scraping the surface of the slope with the end of the pipette. A coverslip preparation is then made in the usual manner and examined microscopically. The *amœbæ* exhibit similar appearances to those found in direct preparations. Ingested red cells are, of course, absent, their place being taken by the easily recognizable rice granules. The characteristic motility of the *amœba* is also observed. Since *amœbæ* other than *E. histolytica* may be present in cultures the usual criteria of differentiation must be borne in mind. The whole preparation must be examined. In some cases several *amœbæ* may be found in most fields, while in others considerable search must be made before a single individual is discovered. The microscopic examination is carried out after eighteen to twenty-four hours' incubation. Should this be negative another examination is made after a further twenty-four hours in the incubator.

*Subculture.*—If the second microscopical examination is negative a subculture should be made. Craig (1934) points out that *amœbæ* may be absent on first or second examination but yet be discovered in subcultures.

To effect subculture 0.1 c.c. of sediment is removed from the medium as described above and is transferred to a fresh tube which is then incubated for twenty-four hours.

*Avoidance of Contamination.*—While *E. histolytica* grows well in a medium containing bacteria derived from the same source as was the *amœba* itself, the addition of organisms from extraneous sources may cause the *amœbæ* to die out from the culture. For this reason a technique which is, relatively, aseptic should be maintained.

## RESULTS.

Specimens of fæces from 405 unselected cases were examined. In most cases the request accompanying the specimens was for microscopic examination for protozoa or cysts. In each case a direct film was made and examined microscopically, and the culture for *amœbæ*

was prepared. In practically every case successive specimens were sent from each patient until a diagnosis had been made in the ward or in the laboratory, or until it was considered by the medical officer in charge of the case that further examinations were unnecessary. These specimens were examined microscopically as received, though only the first specimen from each patient was cultured for amœbæ. Cultures and subcultures were examined at the intervals already mentioned.

The results were as follows :—

Culture positive and direct preparation positive	.. ..	18 cases
Culture positive and direct preparation negative	.. ..	24 cases
Culture negative and direct preparation negative	.. ..	363 cases
Total		405 cases

*Cultures.*—All the cases in which *E. histolytica* was found showed positive cultures. In all cases, too, the first culture was positive, and in all but 3 cases the amœbæ were found on first examination after twenty-four hours' incubation. In these 3 cases first microscopic examination was negative, a positive result being obtained after forty-eight hours' incubation. In the 363 cases in which *E. histolytica* was not found, the primary culture and the subculture remained negative.

*Direct Preparations.*—Of the 42 positive cases, that is, the total number in which amœbæ were detected by any method, *E. histolytica* was found in direct preparations in only 18 cases. The remaining 24 cases were diagnosed by culture alone. This is not to be taken as a direct demonstration of the superiority of cultural methods to ordinary microscopical examination. The circumstances must be considered. When examining a series of some six to seven specimens from a suspected case of amœbic dysentery, *E. histolytica* may be found in the first specimen or in the second or in the third or, quite as commonly, the parasite may not be detected till later specimens are examined. In any event, the competent observer expects, sooner or later, to find the parasite or its cysts if the case be one of intestinal amœbiasis. But if the culture method is employed it is probable that only one or two specimens of fæces will have been examined by the time the culture is ready for the first observation. If the culture is then positive further examination of direct preparations is not required. Should the culture be negative, thus requiring further incubation, and even should a subculture be necessary, there still may be a saving in the number of direct examinations required.

#### DISCUSSION.

The results detailed in the foregoing paragraphs indicate that culture of fæces for *E. histolytica* as a routine measure in the diagnosis of amœbiasis can be of considerable value. Extended observations should show whether or not complete reliance may be placed on the method. It will be necessary to show that cultures are always positive when amœbæ can be demonstrated by direct microscopy in an adequate series of specimens. It will also be necessary to demonstrate that cysts, if present in the specimen, exist or can be otherwise recognized in culture.

Should further observation confirm the results already obtained, the laboratory diagnosis of amœbiasis may become considerably less laborious. The long series of specimens previously essential will no longer be required, though it must be recognized that direct examination can certainly not be dispensed with *in toto*. It will still be necessary to examine fresh specimens for the presence and nature of cells, crystals, ova and other constituents with the same care and diligence as has always been required.

#### ACKNOWLEDGMENTS.

I am indebted to Colonel E. A. P. Brock, Commanding Connaught Military Hospital, for permission to forward this paper.

#### REFERENCES.

- BOECK, W. C., and DRBOHLAV, J. (1925). *Amer. Jour. Hyg.*, **5**, 371.  
 CRAIG, C. F. (1934). *Amœbiasis and Amœbic Dysentery*, London.  
 CRAIG, C. F., and ST. JOHN, J. H. (1927). *Amer. Jour. Trop. Med.*, **7**, 39.  
 DOBELL, C., and LAIDLAW (1926). *Parasitol.*, **13**, 283.  
 ST. JOHN, J. H. (1926). *Jour. Amer. Med. Assoc.*, **86**, 1272.

## *Clinical and Other Notes.*

### USE AND ABUSE OF G.C.F.T.

COMPLEMENT-FIXATION tests for gonococcal infection have had checkered careers and **only** Price's method survives as a practical test. Difficulties of technique and the limitations of both positive and negative results are not well known except to the serologists who carry out the test.

Three factors trouble the serologist : the preparation of a sensitive and specific antigen ; the weakness of the antibody in a positive serum ; and the number of specimens submitted from patients whose condition does not justify the performance of the test. If too many sera are sent, this imposes a severe strain on the limited amount of satisfactory antigen that is available. Antigen for this test cannot be made by mass-production methods ; each batch is necessarily small and many have to be discarded because they prove unsatisfactory on testing. When a good batch of antigen is made it is treated with all the respect accorded to a precious metal ; its use on sera from patients unlikely to be suffering from a gonococcal complication is an extravagance to be avoided. All too often the supply of good antigen is exhausted before another satisfactory one has been made to replace it, and the use of lower-grade antigens results in major disturbances of specificity and sensitivity.

The specificity of the test is high ; that is, a large proportion of the positive results are in truth from gonococcal infections ; only a very small number of false positives are found in chronic infections caused by other Gram-negative diplococci. On the other hand even with a satisfactory antigen the sensitivity is low ; that is, relatively few gonococcal infections produce a positive result and with a poor antigen the figure is very low indeed. Acute infections give a negative G.C.F.T. and only sera from patients with some complication such as posterior urethritis, epididymitis, or gonococcal peri-arthritis are likely to be positive. There is a tendency to send sera for the G.C.F.T. from patients with all sorts of muscular aches and pains, such as "painful flat feet" in a recent request. It should be remembered that chronic gonococcal infection presents a clinical picture much less variable than that of syphilis. In the long run, indiscriminate requests will bring an unenviable reputation on the test ; too many sera will lead to the enforced use of poor quality antigens with a consequent lowering of the sensitivity of the test.

### DIFFERENTIAL DIAGNOSIS OF ENLARGED GLANDS.

GLANDULAR swelling is a manifestation of many diseases ; by itself, therefore, it is a **sign** of little diagnostic value. Acute and chronic infectious diseases, glandular fever, lymphadenoma, and malignant disease, are perhaps the commonest causes of glandular enlargement. These are common to all countries, but in certain parts of Africa diseases peculiar to the **locality** have to be borne in mind.

If the inguinal glands are mainly involved, sepsis, syphilis, lymphogranuloma inguinale, and even bubonic plague must be considered. Frei antigen will help in the diagnosis of lymphogranuloma inguinale, although the results may be difficult to interpret in the native ; and the presence of flea bites is a clue to be sought for in an area where plague is endemic.

Cervical adenopathy presents even greater difficulty in diagnosis and a recent report from West Africa[1] suggests that the early stages of trypanosomiasis may easily be mistaken for glandular fever. Trypanosomes are usually scanty in the peripheral blood at the beginning of the illness when frontal headache and an irregular intermittent fever may be the **only**

abnormal signs. Later, when the cervical glands are enlarged, the clinical picture may be so like that of glandular fever that the absence of the typical blood picture may be very hard for the clinician to accept. A complicating feature is that the serum of such a case may give a positive Paul-Bunnell reaction; in the report mentioned, this test was said to be positive in nearly one-third of 100 cases of proved trypanosomiasis.

The Paul-Bunnell is a non-specific reaction given by all sera having agglutinins for sheep red blood cells. These antibodies are often present to a low titre in normal human sera; in glandular fever the titre is higher but the cause of the rise is unknown. Although most cases of glandular fever give this reaction it rests on such an insecure basis that this discovery of positive results in other infections is not entirely a surprise. The diagnosis of trypanosomiasis properly rests on the examination of material obtained from gland puncture but even in this trypanosomes may not be plentiful. The method of obtaining the specimen is simple: a gland is fixed with one hand and a medium-bore needle pushed into it with the other; twisting the needle will break down a little tissue, and gentle pressure in the gland will force the cellular debris up the lumen while the needle is slowly withdrawn. The specimen is examined unstained and the trypanosomes are seen in motion; for the experienced observer the diagnosis is then relatively easy but if the specimen is blood-stained the movements of microfilariae may mislead the unwary.

In epidemic form infectious mononucleosis presents characteristic features [2] but the name "glandular fever" is probably applied to a number of allied conditions in which glandular enlargement is the most prominent feature [3]; in some the blood picture may not show the characteristic changes and in others there may not be an increase in heterophile antibody; that is, the Paul-Bunnell reaction is negative. In these cases further search for the cause of the adenitis should obviously be made and those in charge of European as well as African troops should bear trypanosomiasis in mind; missed cases may pass unrecognized for some years. This disease is easily overlooked until it has progressed so far that the diagnosis is easy but treatment unnecessarily difficult.

#### REFERENCES.

- [1] *Observations Based on Eighteen Months' Work in a Laboratory of a Military Hospital in Gambia, British West Africa, 1945.* (Report to Director of Pathology by Major A. Henderson-Begg, R.A.M.C.)
- [2] *Brit. med. J.*, 1943, October 9, 443.
- [3] *A.M.D. Bulletin*, 1943, November, No. 29, article 225.

#### INTENSIVE TREATMENT FOR PSORIASIS.

AMERICAN Dermatologists [1] have commented favourably on an intensive method of treating psoriasis which was first described by Goeckermann in 1925 [2]. The treatment demands hospitalization, and is therefore noted here only for the information of those who have the required facilities.

It is said of the regime that it is the most effective therapy for widespread or recalcitrant cases of psoriasis, but those who use it should remember that it carries a hazard common to all intensive methods of treating this disease: it may produce exfoliative dermatitis; therefore it should be reserved for cases in which the lesions are stationary, resistant to treatment, and not particularly inflamed. It should not be used when the eruption is efflorescing.

The Goeckermann regime requires the use of coal-tar ointment, ultra-violet baths, and autohæmotherapy. The ointment consists of a soft paraffin base with 2 to 4 per cent crude coal-tar, 2 per cent zinc oxide, and 50 per cent starch. On the first day in hospital all patches of psoriasis are covered thickly with the ointment, which is left on overnight. Next morning the ointment is removed with liquid paraffin, care being taken to leave a thin film of oil on the skin; the rationale of this procedure is not known, but experience has shown that it is essential.

Ultra-violet rays are then applied to the skin surface in sufficient dosage to produce a mild degree of erythema; blistering must not be caused. It is advisable to divide the body-surface into six areas and to treat each of these individually; the best distribution of the rays is thereby ensured. After the light treatment, the patient spends half an hour to two hours in a bath of water maintained at about 95° F.; during this time scales are removed by rubbing. After the bath a thick coating of ointment is again applied to the affected areas, and still another application is made at night. Autohæmotherapy (10 c.c. of whole blood) is given at two-day intervals for 5 doses.

This combined procedure is continued daily until scaling has ceased and there is little or no induration in the plaques. The period of hospitalization for intensive cases is about two weeks. Tar ointment is not very suitable for use on the scalp, and for this area an ointment containing 5 per cent each of ammoniated mercury and salicylic acid can be used.

In one series of 2,000 cases in which this treatment has been used it is claimed that in approximately 15 per cent the disease has not returned. According to Sulzberger and Baer [3], Keim has modified the regime as follows in order to avoid hospitalization:

The patient applies crude coal-tar 2 to 10 per cent in acetyl alcohol emulsion base to all affected parts before retiring. The next morning a tar-bath is taken. Later, during the day, the areas are painted with liquor carbonis detergens (U.S.P.), which roughly corresponds to liquor picis carbonis (B.P.). Immediately after this painting, the patient is exposed to ultra-violet light. This modified regime has to be continued for four to eight weeks in most cases.

#### REFERENCES.

- [1] O'LEARY, PAUL A. (Mayo Clinic). *Canad. M.A.J.*, 1943, 48, 34-36.
- [2] GOECKERMANN, W. H. *Northwest medicine* (Seattle), 1925, 24, 229.
- [3] SULZBERGER, M. B., and BAER, R. L. *The 1943 Year Book of Dermatology*, page 91, Chicago.

### NEUROPARALYTIC ACCIDENT FOLLOWING ANTI-RABIC VACCINATION.

By Captain E. G. H. KOENIGSFELD,  
*Royal Army Medical Corps.*

[Received September 17, 1945.]

A CASE seen in a military hospital in South India presented a different type of neuro-paralytic accident from that reported by Lieutenant-Colonel Imrie in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, October, 1944.

Lieutenant-Colonel G. B., aged 43, service twenty-three years, was bitten by a dog on January 1, 1944. Anti-rabic vaccination was started at once. 10 c.c. of anti-rabic vaccine were given daily for fourteen days. During the period of vaccination he took some alcohol—in very moderate doses—against medical advice.

The vaccine employed was a 5 per cent suspension of sheep brain (Paris strain of fixed virus) in carbol-saline, prepared by Semple's method. Immediately after the last injection the following symptoms were recorded by the patient:—

Severe headache, pains and paræsthesias in thighs and arms, blurred vision, restlessness and complete insomnia.

He was examined at the Government Hospital, Ootacamund, from which he was admitted to the British Military Hospital, Wellington, on January 26, 1944. At the Ootacamund Hospital optic neuritis and absence of abdominal reflexes were found.

*On admission to the British Military Hospital:—*

An officer of 43 years of age, of excellent physique. Vision very hazy, right eye 6/6, left eye 6/9. Knee-jerks and Achilles tendon-jerks were rather brisk, the gait was somewhat

spastic, but plantar response was of the flexor type. Babinski's and Gordon's signs were not clearly present. Abdominal and cremasteric reflexes were elicited.

Romberg's sign was positive and some tremor of the hands was present. There was marked hyperalgesia of the muscles of the calves and thighs, paræsthesia and numbness of both legs.

The patient was very restless and showed signs of severe anxiety but was mentally alert. He was completely sleepless in spite of strong hypnotics. Bladder and rectum functioned normally.

There was no fever; the pulse was 65 to 75; B.P. 125/80.

The fundus examination showed a retrobulbar neuritis of both eyes. During the following days his vision deteriorated steadily, and on February 3 he was almost completely blind in both eyes. But from the end of the second week of his stay in hospital his vision began to improve gradually. By the end of February his eyesight was almost normal but still hazy.

The pains in his legs at that time were almost gone, but all sensations in the lower extremities were diminished and he had a feeling of numbness and heaviness in the legs. Romberg was then still positive. The gait was rather *ataxic*. Knee-jerks and Achilles tendon-jerks were normal. Babinski negative.

General condition and sleep were much better by then, but Mist. 3/15 had still to be given in full doses two to three times a day.

Slight massage was started during the last week of February—no lumbar puncture was performed.

Further treatment consisted in injections of vitamin B<sub>1</sub>, 50-100 mgm. a day, cod-liver oil and liver extract.

By the end of the first week of March the patient had further improved—he still complained of slightly blurred vision. His general condition was satisfactory, he slept better and had no pains in his extremities. There was still numbness of both feet and gross diminution of all sensations in the legs. The gait was still unsteady, and patient had to use a walking stick. However, he was considered to be well enough to be discharged from hospital, and made a complete recovery during the following six months. He was fit for Category A when seen in February, 1945.

It is noteworthy that the main feature of our case was optic neuritis. As far as we are aware this condition *has never been described* so far, although there is no reason why the optic nerve should not be affected as well as other cranial nerves.

This case probably should be described as a neuritic type of paralytic accident although the temporary loss of the superficial reflexes, the spasms, the anxiety, the sleeplessness and restlessness suggest an affection of the spinal cord and higher centres as well.

In a number of cases it may be impossible to differentiate a peripheral neuritis from pathological changes in the central nervous system, and both may exist together.

The question of the ætiology and classification of neuromyolytic accident has been aptly discussed by Colonel Imrie in his article.

Perhaps the inclusion of paralytic rabies in the classification of neuromyolytic accident should be questioned. It is an infection in spite of proper vaccination, a hydrophobic condition not prevented by treatment and not caused by it.

If ever Negri bodies have been found in cases of paralytic rabies after treatment, as Colonel Imrie believes, this would be a definite indication that this group should not be regarded as neuromyolytic accidents.

Negri bodies are an essential feature of genuine rabies and have not been found in cases of neuromyolytic accident.

[Although not reported in literature we are aware of one other case where an optic neuritis was ascribed to the effects of anti-rabic vaccination. This case, also, recovered completely.—ED.]



## *Reviews.*

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**THE SHAPING OF PSYCHIATRY BY WAR.** By Brigadier J. R. Rees, M.D., F.R.C.P. London: Messrs. Chapman & Hall, Ltd. 1945. Pp. 158. Price 10s. 6d.

In the 1914-18 war Dr. T. W. Salmon, who had played an important part in the development of the mental hygiene movement in America, served as Consulting Psychiatrist to the American Army. Volume 10 of the United States Army Medical History of that war, which deals with the psychiatric service he developed, is a monument to his great work in that capacity. It was a notable compliment to the Consulting Psychiatrist of the British Army that in this second world war he should have been invited to deliver the annual lectures by which Colonel Salmon's work is commemorated at the New York Academy of Medicine. These lectures have now been published in this country as a book under the title of "The Shaping of Psychiatry by War."

The contents of the book fall naturally into three parts: the first—a discussion of the psychiatric implications of the impact of war on the individual and on his society; the second—a survey of many of the specific problems that have arisen in this setting in the Army and the contributions that Army Psychiatrists have been able to make to their solution; and finally—the lessons that may be learnt from this experience and applied for the future benefit of the whole community.

Rather than attempt any fully documented history of a single specific aspect of military history, the author has preferred to paint a broad picture of its whole scope and its general social implications. The picture he paints makes it clear that psychiatry has undergone considerable development in the British Army during this war—development not only in specific activities of techniques but also in viewpoint; for it is evident that, in as far as war has shaped psychiatry in the British Army, to use the phrase by which the book is titled, it has produced in it the sense of social responsibility which the purely clinical branches of medicine have unfortunately sometimes failed to display. It has, in fact, evoked in the psychiatrist the attitude of the hygienist which T. W. Salmon spent his life in trying to foster. All workers in the fields of medicine and the social sciences would profit by reading this humane and stimulating book, even though they may disagree with some of its conclusions.

**ESSENTIALS OF SURGERY FOR DENTAL STUDENTS.** By J. Cosbie Ross, M.B., Ch.M., F.R.C.S. Edinburgh: E. & S. Livingstone, Ltd. 1945. Pp. viii + 284. Price 20s. net.

This book, as stated in the preface, is written for dental students commencing their general hospital practice. It is largely a synopsis of what they are expected to learn, being a catalogue of conditions with brief notes on the signs, symptoms and treatment. The almost complete absence of pathology militates against its usefulness as a textbook.

It will hardly be of use to the qualified man as it is not nearly full enough for those engaged in hospital work, while the general practitioner is rarely likely to meet with the majority of the conditions described.

The chapter on radium therapy is good and one would have liked more of it, but fractures of the jaw are dealt with in a mere 12 pages.

The book is well illustrated with photographs, X-ray films and diagrams and these form much the most useful part, and it is well produced and printed on good paper. R. A. B.

**EXTENSILE EXPOSURE APPLIED TO LIMB SURGERY.** By Arnold K. Henry, M.B. (Dubl.), M.Ch., F.R.C.S.I. Edinburgh: E. & S. Livingstone, Ltd. Pp. viii + 180. Price 30s.

This excellently produced book describes in an unorthodox manner the surgical anatomy of the limbs. Many original or unusual approaches are included, such as a method for the drainage of the palmar space from the ulnar border of the hand and an exposure of the sciatic nerve and the deep structures of the buttock by reflecting gluteus maximus. In addition a large number of practical aids to the operative surgery of the limbs are described.

On two occasions the author digresses from the true purpose of this book to recommend the use of B.I.P.P. as a local application to recent compound fractures, and it is to be hoped that in future editions these will be omitted. However, this book is highly recommended to all surgeons experienced or inexperienced, general or orthopædic, as a very valuable guide to the surgery of the limbs.

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### Correspondence.

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#### THE INCORPORATED SOLDIERS, SAILORS AND AIRMENS HELP SOCIETY.

##### LORD ROBERTS MEMORIAL WORKSHOPS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—We are profoundly thankful for Victory ; we are acclaiming the superb courage and devotion of our fighting men, and as it is the unanimous resolve of a deeply grateful people to see that Service men and women are happily reinstated in life, I would call your readers' attention to a scheme to ensure the care of our disabled which is most richly deserving of the support of the generous-hearted. It is the LORD ROBERTS MEMORIAL WORKSHOPS of over thirty years' standing.

The value of these Shops as a source of training and employment for the seriously disabled has been magnificently proved. Men are admitted suffering from a high rate of disablement and here, encompassed by sympathy and understanding, they gradually attain a remarkable degree of skill in the execution of new and useful trades and regain their former independence. Thousands have already passed through these factories ; the majority of the men have been able subsequently to work side by side with their able-bodied comrades in the industrial world. Others whose handicap is too great to allow of this have found permanent facilities and employment in the Workshops where machinery specially designed for such workers is available for their use.

The SOLDIERS, SAILORS AND AIRMENS HELP SOCIETY has administered the Lord Roberts Memorial Workshops throughout the years with notable success and the Council is now striving, by every means at its disposal, to provide training and employment for the disabled of this War, that they may be given the utmost opportunity to overcome the grievous misfortune of broken limbs and health.

Large funds are needed for this worthy object and as Lord Roberts' birthday falls to-morrow, I feel no more fitting tribute could be paid the memory of that illustrious soldier than to support the Workshops in which he took the deepest interest and in which his name is enshrined.

I ask your readers to send donations, liberal donations, so that we may realize our object of helping adequately those who have sacrificed so much in serving our cause with selfless devotion and who have our measureless gratitude.

Every contribution sent me will be invaluable in this great work.

*Appeals Department, Head Office,*

*122, Brompton Road,*

*London, S.W.3.*

*September 24, 1945.*

Yours faithfully,

KEYES,

*Admiral of the Fleet.*

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### Notice.

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All copies of the Journal for October, 1945, were, owing to a mistake in the production of addressed wrappers, despatched with two wrappers. The inner wrapper should have been ignored. The inconvenience to subscribers is regretted.



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Journal  
of the

# Royal Army Medical Corps.

## *Original Communications.*

### SURGICAL ADVANCES DURING THE WAR.

By W. H. OGILVIE, M.Ch., M.D., F.R.C.S., Hon.F.A.C.S.,  
*Late Major-General. Consulting Surgeon.*

[Received November 16, 1945.]

If we look in retrospect over the six years of war, we cannot help being impressed by the progress that has been made in war surgery. So great is the change between then and now, that we are apt to assume that it is all surgical and all advance. In order to assess fairly where we stand, we must recognize that there are three aspects to the matter: advances in accessory methods that help surgery, real and permanent advances in surgical technique, and improvements due to altered conditions of warfare. Of these the first is the most important.

The excellent results of surgery in this war compared to those in any previous war are undoubtedly due in part to the fact that the modern soldier is first-class human material, and that his fitness is maintained up to and during battle and preserved from the time of injury to the time he reaches the surgeon by the services that train, clothe, feed, house and transport him. It would be impossible to overstate the value to the surgical services of modern transport, from the ubiquitous Jeep, that mechanized mule that can go anywhere that man or animal can go to pick up and bring back wounded, to the Dakota that has worked from strips laid down a few hours after the battle has passed on and has abolished time and distance. Modern transport has served to get surgical units right forward, to move them as the line moved, to keep them supplied at all times; it has brought the wounded rapidly and smoothly to the advanced operating centres and away again to centres of definitive surgery and the more specialized units; in short, it has allowed surgery to be done as the needs of the wounded demanded rather than as the exigencies of war allowed.

The aims of war surgery, stated in the broadest possible terms, are to save life, to prevent suffering and to preserve function, and the chief causes of death, pain and disablement are hæmorrhage, shock and infection.

Of the medical advances that have contributed to surgical progress, the most outstanding is undoubtedly resuscitation as practised by the Army Blood Transfusion Service. This service, which, as a separate organization, is peculiar to the British Army, has enabled surgeons to operate, to operate without nervous haste, and to operate successfully, on men with

injuries that would certainly have placed them in the hopeless category in the last war, and has, in the opinion of the writer at any rate, been a potent factor in reducing the incidence and lessening the mortality of gas gangrene.

When the service was started at Bristol shortly before the war under Sir Lionel Whitby, resuscitation stood very much where it had done at the end of the first world war. Stored blood, though it had been used in Russia and Spain, was not in common employment. Liquid plasma was known but rarely used, and dried plasma and serum were unknown. Within a few months a large panel of donors had been raised in the West of England and an organization for collecting blood had been devised, a set of apparatus that in many parts of the world and under the most trying circumstances has shown itself to be better than that of any other army had been designed and put into large scale production, and considerable research had been carried out on the keeping properties of blood under every condition likely to be encountered, and on the means of sending it by every kind of operational transport. Blood substitutes were investigated, a technique for the filtration of plasma was developed, and a drying plant was installed. In addition to blood and blood substitutes, the service has supplied crystalloid fluids to the whole Army.

Under this central organization a base transfusion unit was established in every theatre of war to organize supplies of whole blood and liquid plasma from local resources and to distribute apparatus and dried plasma from home. The units in Middle East, and later that in B.L.A., were commanded by Lieut.-Col. G. H. Buttle. An essential part of the overseas transfusion service was the Field Transfusion Unit, consisting of an officer, specially selected and trained in the technique of resuscitation, and having with him technical assistants and a refrigerator van to carry his store of whole blood. The influence that the Army Transfusion Service with its band of experts has had on war surgery cannot be exaggerated. It became recognized that the Field Transfusion Officer was the key man of a forward surgical group, that without him a surgical team was robbed of half its value, and that where he worked the pre-operative ward over which he presided was rightly the functional hub of the surgical centre from which reception room, X-rays, operating theatres and wards should radiate.

Traumatic shock may have many causes and may be reproduced in the laboratory in a number of ways; but the experience of the battlefield has shown that in the healthy soldier recently wounded, shock is essentially oligæmic. The treatment of shock is early, rapid, and adequate replacement of the lost volume, and adequacy must be assessed in quality as well as quantity. In the first two years of the fighting research workers, especially in America, were plasma-minded to a dangerous degree. It was soon learned, however, that though plasma can restore blood volume in shock and apparently restore blood-pressure, it cannot bring a man who has lost blood into a condition to withstand operation, to ward off gas gangrene or to overcome infection, while its value in restoring blood-pressure is not great in cases where there is a blood loss of 40 per cent or more of the circulating volume or where the loss is likely to continue. The amount of resuscitating fluids used varied from campaign to campaign and from battle to battle with the type of fighting and the availability of blood, but in general 30 pints of blood and 20 of plasma are needed at a forward operating centre for every hundred casualties. The only criterion is the need of the man. The quantity to be given is the quantity he has lost; the rate at which it is to be given is as rapidly as possible till his systolic pressure has reached 90 to 100 mm. In cases of necessity blood has been given at the rate of half a pint a minute by using two veins simultaneously, and as much as 18 pints has been given in the course of a two-hour operation. Reactions have been recorded from the giving of incompatible infected or hæmolyzed blood, but reactions with blood correctly grouped only occur in the oft transfused, and should not be encountered in forward surgery, where it was said that "Blood can do no harm if it is sent by Buttle and given by Buttle's boys." Anuria has been reported following transfusion, but the available evidence suggests that this is due not to the blood, but to the lack of it; that the kidneys are irretrievably damaged during the period of low blood-pressure that precedes transfusion, which thus allows men who would otherwise have died to survive long enough to develop anuria.

Chemotherapy has developed from tentative beginnings under the stimulus of war. At the outbreak only sulphanilamide and sulphapyridine were available, and nothing was known about their use in wound treatment. At the time of Dunkirk the position had not changed greatly: sulphathiazole, more potent than sulphanilamide and less toxic than sulphapyridine, had been added, but no firm conclusions on the practical applications of chemotherapy in war had been reached. The prophylactic use of sulphanilamide at the time of wounding was advocated, but, partly owing to supply difficulties, the suggestion was never implemented in the British Army, and it was not till America came into the war eighteen months later that the local application of sulphonamides with the first dressing was tried on a large scale.

By 1942 the experience of desert fighting had established the value of the sulphonamides in prophylaxis. They failed, as might have been expected, to sterilize contaminated wounds or to prevent infection in those which had received no surgical treatment, but they were able to keep a local infection local and to prolong from a few hours to many days the period during which the excision of dead and contaminated tissues was safe and profitable. This phase of the fighting was characterized by the length and difficulty of the lines of communication, by the light equipment and constant movement of the forward surgical units. During heavy battles, of which there were many, the first priority cases, abdominal and sucking chest wounds, hæmorrhages and mangled limbs, absorbed the forward operating potential, and all others had to be sent further back, many travelling several hundred miles before receiving their first surgical treatment. It was found that where selection had been good, the immobilization well carried out, and sulphonamides administered regularly from the time of wounding, these cases arrived in excellent condition, their wounds possibly foul and smelly, but the limbs around them soft and free from the signs of inflammation. The wounds were bacteriologically but not clinically infected and the patients were comfortable and well. At this time all transportable head injuries were sent back to the neurosurgical centre at Cairo, where excision and suture was nearly always found to be possible up to four days after injury. In all these casualties, regular chemotherapy was assured by the simple method of twice daily administrations instituted by Colonel Buttle, to whom British war surgeons and British wounded owe more than to any single man. Previously, when four-hourly dosage was attempted, the amount actually given on the line of evacuation was a matter of guesswork; afterwards every man put on sulphonamides and carrying the conspicuous sulphonamide label, received without fail five tablets at 08.00 hours and 18.00 hours, wherever he might be at the time.

In 1943 the first trials of penicillin were made in North Africa during the Sicilian landings. As supplies became plentiful and the Army moved up through Italy, penicillin was used increasingly in the forward treatment of wounds, and the operation of two-stage closure that was developed as a main plank in surgical policy in Italy was made possible by the help or at any rate by the feeling of confidence that it gave. When 21 Army Group invaded Normandy in 1944, they went with a fully organized penicillin programme and a penicillin officer to observe, advise and supervise its administration. Even in the grim weeks of the beachhead the majority of casualties had their first injection of penicillin within a few hours of wounding and maintenance doses during treatment and on the way to England. Later, when the Army broke out from that strip, penicillin administration was carried out during the whole phase of advance across Europe, regardless of movement and distance, with the same regularity as in a civil hospital.

The part that chemotherapy has played in war surgery can be assessed fairly only when the tumult and the shouting have died. At present, as with any new discovery of value, those who have fostered the method, those who feel that a nation at war should cry its wares, and those merely on the lookout for items of news value, tend to pull out the loud stop, while the honest and the cautious react by stepping on the soft pedal. Whether chemotherapy has influenced the course of flesh wounds reaching the surgeon early and treated by efficient excision is open to question. The general opinion of forward surgeons is that such wounds remain clinically clean and can be closed by delayed primary suture from three to five days later, whether treated with penicillin, sulphonamides or with no bacteriostatic. In gas

gangrene, too, there is no useful evidence that chemotherapy has played any part in delaying infection or saving life.

In more complicated wounds—those first receiving treatment many hours after injury, those in which complete excision has been impossible or in which dead space remains afterwards, those in which oozing or soiling from discharge continues after operation or in which bone is involved—chemotherapy has increased the scope and safety of surgery and allowed earlier closure. The secondary suture of compound gunshot fractures within ten days of wounding, converting them from open to closed fractures, is one of the outstanding advances of this war: that direct fixation of the bone fragments and the burying of unabsorbable materials in any quantity has led to failure, does not detract from the success of closure when such liberties are not taken. In wounds of the head and spine chemotherapy has given greater safety and improved results. In thoracic injuries, direct installation of penicillin into the pleural cavity has altered the outlook in hæmothoraces, reducing greatly the incidence of chronic empyemata and permanently damaged lungs. Operations for the removal of dead bone and inaccessible foreign bodies, and reconstruction operations, particularly those involving bone grafts, can, with the help of penicillin, be undertaken earlier and with correspondingly improved functional results, without the fear of a systemic flare-up following interference.

Penicillin is undoubtedly more efficacious and more widely applicable than any of the sulphonamide group. It is unaffected by the presence of pus or body fluids or by the density of the infection, and it is innocuous to the host in any quantity and over any period. The limitations to penicillin therapy lie in its bacterial field, which, however, contains most of the dangerous pathogens, and in the difficulties of its distribution and administration, which demand pathological control and hospital facilities that are not necessarily available everywhere and at all times in war. It would be a mistake to look on the final campaign in Europe as in any way typical of warfare. The luxury conditions under which the medical services worked, of personnel, of auxiliary help, of housing, of immunity from attack, of supplies of every kind, and of intake and evacuation of casualties, have never been seen before and are unlikely ever to be seen again. The sulphonamides can be used in any conceivable conditions of warfare and, combined with surgery, can give a protection that, while perhaps inferior to that conferred by penicillin, is a great advance on anything known before.

While resuscitation and chemotherapy are the two outstanding advances in parasurgical sciences that have led to surgical progress during the war, it must not be forgotten that many of the methods which during the campaign came to be looked on as a matter of course were new or on trial at its beginning. In the surgery of abdominal wounds, the routine post-operative use of gastric suction and intravenous fluids in all cases with lesions involving the alimentary canal was one of the chief factors contributing to the greatly improved results which have been recorded everywhere. These methods were only finding their way into civil surgery in 1939 under the influence of Wangenstein, and their introduction into the Army was largely due to the example of Major T. Giblin of the Australian Force in the Desert.

Against this background of improved surroundings in which surgeons, having at their disposal accessory methods unknown in the last war, worked upon the fittest fighting men in history brought to them by every device of modern transport, must be considered actual progress in surgical methods. Most important and most striking has been the gradual change in wound treatment: first excision, vaseline packs and closed plaster treatment; then excision, with drainage, immobilization in padded and split plaster casts and simultaneous sulphonamide therapy during evacuation; later the two-stage operation in which the primary debridement and the closure of the wound three to five days later were looked on as parts of one procedure, separated in time by the need to avoid the dangers of fulminating infection, and in space by the exigencies of war; finally the organization of forward surgery, penicillin therapy, evacuation, and base surgery with the object and result of closing 90 per cent of wounds within a week of their infliction.

To those who read the report of the Inter-Allied Surgical Conference in Paris in 1917, it

may seem that the final result of wound treatment in this war was to arrive at the same conclusions as did the surgeons in the last, with the added safety and improved results made possible by penicillin, and that the closed plaster treatment was an unfortunate interlude that set the clock back, confused and obscured the lessons that had been learned by 1918, and delayed the development of wound closure by some two years. Neither of these views is accurate. The closure of wounds in the last war made its appearance only in 1917, and at the Armistice it was by no means universally accepted or firmly established; the indications for suture were not clearly realized nor the dangers of primary suture appreciated. In this war the matter has become one of surgical policy rather than individual enterprise. It has been realized that delayed primary suture, if certain precautions are observed, can be practised without serious risk in the great majority of soft tissue wounds, and it is equally realized that primary closure, at any rate in wounds of the limbs, is wrong. The closed plaster method again is not an anachronism, but the best possible method under austere conditions of warfare that may be seen again, though it should never replace the two-stage closure when conditions make this possible.

In the treatment of late sepsis, the Bunyan-standard envelope has provided a device better than anything previously available. Modern methods and favourable conditions have made the kind of wound needing continuous or intermittent irrigation much rarer than in the last war; but for the granulating stumps of guillotine amputations, infected compound fractures of the bones of the leg, and late septic burns, the Bunyan bag has proved ideal, abolishing pain instantaneously and doing away with the need for dressings, yet allowing constant inspection and, if necessary, palpation of the wound surface through the transparent and flexible material, and bringing a foul sloughing wound to a state of clean healthy granulations in a few days.

There has been little progress in the operative treatment of vascular injuries. As in the last war, most surgeons carried arterial sutures in their kit, but few had the luck to find a lesion to suture and fewer still succeeded in restoring a patent vascular channel. A trial was made, especially by Canadian surgeons, of joining temporarily the severed ends of a main artery by tubes of glass or acrylic resin, in the hope of maintaining the nutrition of the parts distal to the injury till a collateral circulation had been established and shock had been overcome. Maintenance of a useful circulation was seldom obtained, and the method had so many obvious risks, the washing of toxic products or thrombi from the distal part of the limb into the general circulation, and the bleeding from other wounds which followed the necessary heparinization, that the method came to be regarded as no more than an interesting experiment, suitable only to conditions of luxury warfare and unlikely to pass into accepted practice. Ligature of a divided vessel has remained the standard treatment for arterial injury.

Much, however, has been learned about the care of the patient and the limb in cases of arterial injury, and the incidence of gangrene and of amputations has been appreciably lowered. The essentials are, first, restoration of the circulation to full efficiency and of the circulating blood to full oxygen-carrying power by transfusion of an amount of blood equal to that lost. Secondly, the fullest utilization of all channels leading to the threatened limb. In Africa dilatation of collaterals was obtained by injecting the sympathetic ganglia, but later it appeared that a more effective dilatation is obtained by warming the whole of the body except the limb. Trial has been made of fascial decompression, particularly in the calf after popliteal ligation, in order to assist the flow in the arterioles and capillaries, but without much success, and this step is probably unwise unless the calf is obviously tense. Thirdly, reduction of the metabolism of the starved tissues and, therefore, of their demand for oxygen. This is achieved by keeping the limb cool. The maximum benefit is probably obtained by exposure to room temperature in a cool climate, and further cooling by ice may cause damage.

The surgery of abdominal wounds has remained practically unchanged since the last war, an indication, not of any lack of assertiveness in the forward surgeons of this war, but of the high standard set by those of the last. That the results are better is due, above all, to acces-



sory methods, to rapid and smooth transport, to the abundant supplies and nursing facilities that were put forward, to rapid and adequate resuscitation before operation, to suction and intravenous fluids afterwards. The one technical advance to be recorded is the adoption of a policy of exteriorizing colon wounds and performing proximal colostomy for those of the rectum and even for large buttock wounds near but not involving the anus. Experienced surgeons have safely sutured small wounds of the large bowel, particularly on the right side, but exteriorization remains unchallenged as a general policy.

In wounds of the head, the chief advance has been the organization of special units to attend to these injuries. In Africa till the end of 1942 head injuries were all sent to a neurosurgical centre at the base in Cairo, and the clean healing and excellent results that were obtained under these difficult conditions were proof of the advantages of segregation as well as of the great value of the sulphonamides. When the line lengthened beyond Benghazi, a second neurosurgical unit was sent to work in Cyrenaica, and as the pursuit continued this unit was split into an advanced section with the Eighth Army and a base section at Tripoli which received the less urgent cases direct from the front and undertook the after-care of those operated upon by the forward unit. Later an ophthalmic unit was grouped with the neurosurgical one, and eventually in Italy an otolaryngologist and a maxillo-facial surgeon were added to the team.

In general, it may be said of special surgery that the policy of having few units, and those large and good, has proved its value against the alternative one of peppering a number of lesser experts round the forward surgical groups, where segregation is impossible, and the one-track man is little help to his hard-pressed colleagues yet gets too little of his own work to learn much. These specialist units have been placed so far forward that they can receive the majority of the severely wounded after resuscitation but without previous handling yet far enough back to be at the meeting point of several lanes of forward evacuation and to be well housed, staffed and supplied.

The results of this policy can be seen in improved results, whether judged by mortality, by clean healing, or by the control of late infection. The death-rate from penetrating head injuries, which was 45 per cent in the only fully recorded series of the first world war, that of Cushing, fell to 20 to 25 per cent in the fighting in Africa, Italy and Normandy, and to 10 per cent in the later stages of the fighting in Europe. Deaths from late infection, which amounted to 25 per cent in Cushing's cases, were 11 per cent in the earlier African fighting, 4 per cent in the Tunisian campaign and 6 per cent during that in Europe. The percentage of operation wounds healing by first intention has risen during the war from 70 per cent to 90 per cent. The same general principles as were enunciated in the last war remain, but the advent of bacteriostasis has enabled primary closure to be carried out in the majority of cases.

A new concept is the closure of basal wounds, not merely from the skin, but from the cavities of damaged air sinuses by radical treatment of the sinus and by patching the dural defect with fascia lata. It is in such wounds that the co-operation of the otolaryngological and maxillo-facial teams has proved particularly useful.

In chest surgery special teams have rendered the greatest possible service, particularly in the evolution of principles, in studying the application of chemotherapy to thoracic injuries, and in dealing with late complications. The chief advance that has become apparent during the war is the acceptance of the principle that an injured chest should be emptied as soon as possible, not merely of blood, but of air, a principle expressed in the slogan of the Consulting Physician to 21 Army Group, quoted by his surgical colleagues, "Having saved the life, save the lung."

Plastic surgery in the last war was concerned with the late repair of severe deformities, particularly those of the face, at special centres in the United Kingdom. In this war maxillo-facial units, more properly designated plastic units, for much of their work was concerned with injuries other than those of the face and jaws, were attached to each Force in the Field. While no striking departure from the principles laid down at that time have appeared, the

presence of forward plastic units has enabled facial injuries to receive their first treatment upon lines designed to help the subsequent reconstruction, and the final stages have been carried out many months earlier with the help of penicillin. Plastic surgeons have co-operated with neurosurgeons in the primary treatment of head injuries and with orthopaedic surgeons in late repair work, they have assumed the care of major burns and of flesh wounds with large skin loss, and by their advice on straightforward methods of skin grafting and simple flap transference, they have been largely instrumental in extending the practice of two-stage closure to about 90 per cent of soft tissue wounds and to a proportion of compound fractures that is only slightly less.

The third aspect of advance, the change in the circumstances of war as they affect surgery, must be taken into account in any fair assessment. In 1941 Britain was alone, fighting for her life against a world of enemies; in 1945 her armed forces, with those of her allies, were sweeping all opposition before them. In Abyssinia wounds of the limbs were treated by the closed plaster method and healed by granulation, and wounds of the head and abdomen were, for the most part, fatal. In Africa flesh wounds were excised and drained forward and closed by secondary suture at the base, many hundreds of miles away, about the third week; the mortality of head wounds was about 20 per cent and of abdominal wounds about 40 per cent. In the Italian and European campaigns wounds were closed within the week by the two-stage operation, and the death-rate for head wounds fell to 10 per cent and for abdominal wounds to 30 per cent during the final stages.

This general improvement does not in any sense represent an advance in surgical skill. The progress to two-stage closure has been a gradual development, aided by steady advances in chemotherapy, for which the surgeons in Italy deserve full credit, but a development only possible in the surgery of an Army that was always advancing and confident of victory, protected day and night by an aggressive air force, rich in transport and supplies. To have carried out two-stage closure under the conditions of the desert advance would have been impossible; to have attempted it in Abyssinia would have been criminal folly. The results with abdominal wounds depend still more on time, place and circumstance, for in these injuries chemotherapy offers little help; the figures of any surgeon or of any group reflect, not success or failure, skill or incompetence, but the interplay of factors over which surgeons themselves have no control and medical administrators but little. It cannot be foreseen that the Ritz-Carlton conditions which the medical services on the Allied side enjoyed during the closing phases of this war will ever be repeated, and under more austere conditions a return to the simpler methods that have shown their worth in the past may be the truest form of advance.

## THE DEVELOPMENT AND THE RESULTS OF TRANSFUSION IN THE TREATMENT OF BATTLE CASUALTIES.

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THE treatment of so-called " Wound Shock " in battle casualties has always been a major problem, and this dangerous state is the first fence that has to be surmounted along the path of a man's recovery. If the fence is not cleared, then none of the other hazards—operation, infection, asthenia, renal failure, etc.—which have also a high mortality, enter into the picture, and none of the modern methods for dealing with these later hazards—skilled surgical teams, sulphonamides, penicillin, etc.—have an opportunity to contribute to recovery. At the outset of the war, we had for our guidance the extensive experience of the 1914-18 war, as well as the experimental work which had been carried out since that time. Two main principles had been established beyond doubt. The first and most fundamental was that the chief *initiating factor* in the so-called " shock " of wounded men was oligæmia, due to blood loss or plasma loss, or both, either externally or into the tissues, so that the volume of circulatory fluid became acutely and seriously reduced; and the cardiac action embarrassed, leading to a vicious circle of events, terminating in death. The second principle was that there were a number of *contributing factors* which could add greatly to the seriousness of the condition and to the rapidity with which deterioration occurred ; these included pain, cold, fear and dehydration. At the beginning of the war, it was felt that the major portion, if not all, of the problem of " shock " would be met by the provision of an efficient transfusion service, coupled with ample measures for dealing with the contributing factors. Experience has justified these views, but it has also brought to light a number of new facts, ideas and principles which have clearly shown that transfusion is neither a panacea for all suffering from so-called " shock " nor by any means the complete answer to the problem. For example : though it has been found (Kekwick *et al.*, 1941) that a man who has suffered a huge loss of blood, say two or three litres, may still survive, provided he is promptly and adequately transfused, yet, in others with far less blood loss an appropriate transfusion may fail to revive, or fail to maintain a good condition, or may restore only temporarily, so that death occurs at operation, soon after or perhaps from renal failure, some days later. Under battle conditions, the opinions concerning the merits of different methods of treatment, or of the virtues or failings of blood or blood substitutes, must be greatly influenced by the phase at which the observations are made. Thus, the Field Transfusion Unit officer will form his opinion on the immediate result, or the Field Surgical Unit officer upon how the patient stays the course of the operation. Both may be unaware that an apparently brilliantly successful case has died in another hospital, sometime afterwards, from the remote effects of the wounding or the treatment upon the renal or other functions. These aspects have to be taken into consideration when attempting to assess the results of transfusion. The most reliable deductions will obviously be derived from cases in which there has been continuity of observation, as with the special teams that have worked in the field, and it is the final reports of these teams which will be the most informative.

*The Reaction of the Body to Injury.*—" Shock," though a convenient and commonly used term, is one which is much misused. When stripped bare and reduced to a cold definition, it means no more than that a man looks ill, even to the point of death. Yet many may appear to be in this state from no more than a trivial injury or even a psychological cause. The term " shock " is nowadays never used by the well-trained medical officer, without a description of the clinical features which he observes at the time. This, indeed, is what is meant by " shock." It is not a specific entity, but consists of a well-known train of clinical symptoms

and signs, including lowered vitality and circulatory embarrassment, the latter manifested by pallor, peripheral coldness, sweating, cyanosis, a blood-pressure which is usually reduced and a pulse which is usually fast and of poor volume. From these variable signs, the decision has to be made as to whether to transfuse or not. Much has been learned during the war concerning the factors influencing such a decision, as well as the choice of fluid, and much has been learned of the results that may be expected, either immediate or remote. Something has been learned of the reaction of the body to different types of injury. For example, the oligæmia of the injured man may be due to blood loss, which may indeed be unbelievably large in the case of massive limb injuries, or to plasma loss, as has always been known in the case of burns, but which is now known to be a dominating feature in crush injuries, and which is apparently prominent in abdominal injuries (Grant, 1945). In the last named, blood loss was at one time thought to be more important. Gross dehydration, caused by profuse sweating, diarrhoea, vomiting and restricted fluid intake, especially in tropical countries, may also produce oligæmia, and thereby cause or exaggerate the "shock syndrome." This separation of the types of reaction to injury influences the choice of fluid which should be transfused and has brought the art of resuscitation into the realm of specialism. And similarly with the clinical picture. Though the classical case reacts to oligæmia by a lowered blood-pressure and a fast pulse, there are many, especially among fit young men, in whom the reaction is hypertension (Conway, 1945).

*Selection of Cases.*—It will be clear, therefore, that the assessment of a case on its superficial appearance or early observed clinical findings can be very misleading. None of the prominent features—pallor, cyanosis, sweating, blood-pressure, pulse, or mental state—can be considered reliable at the outset, but a continuing improvement, as shown by serial observations under active treatment, will indicate the optimum time, often fleeting, at which the surgeon should operate. Experience has shown that assessment at the outset should be made on common-sense grounds on two quite broad criteria—(1) probable blood (or plasma, or tissue fluid) loss, and (2) the extent of the damage. When either or both of these are adjudged to be large, the patient's life is in grave danger, whatever his superficial appearance may be. Rapid and adequate transfusion of the appropriate fluid is always required. Conversely, however moribund the patient may seem, there is always a chance of bringing him back to life, provided his injury is not overwhelming or does not involve some vital organ. The main decision that has to be made is whether to transfuse or not. When in doubt, transfuse, in that transfusion is the most important single requirement of the seriously wounded man (Kekwick *et al.*, 1941; Grant and Reeve, 1941).

*Features Other Than Oligæmia.*—It is now well known that the initial oligæmia associated with the crush syndrome is equalled in importance by the remote renal failure due to toxic substances. The re-discovery of this fact revived interest in the "toxic" theory of shock and drew attention to the importance of ultimate prognosis, as distinct from immediate recovery. The toxic theory postulates deleterious substances derived from injured tissue, which may quickly cause a disordered circulation or ultimate renal failure. Circulatory embarrassment has long been known to occur with a frank fulminating infection, such as acute gas gangrene, but, despite much experimental work between the two wars, no evidence could be found for toxæmia following simple injury. Recently, the Sheffield School (Green, 1943) have demonstrated that such toxic products may arise; they have even made some speculation as to their probable nature. There is no doubt that the greater the tissue damage, the more rapidly does this aspect enter into both immediate and remote prognosis. As a rough clinical guide, it has been suggested that whenever the amount of tissue damage exceeds the volume of two clenched fists (Grant, 1944), then toxic complications, immediate or remote, are probable. The essential treatment is to deal with the damaged tissue surgically at the earliest possible moment. Indeed, in such cases, surgery may be almost as imperative as transfusion, and may have to take place before the theoretically ideal response to transfusion has been obtained.

Another re-discovery of the war has been the frequency with which injured men develop some degree of renal impairment. Nearly all, if carefully examined, will be found to have

casts or red cells in the urine at some stage ; a number develop oliguria ; others die of anuria, which is apt to be wrongly attributed to incompatible transfusion. Some of this trouble is doubtless due to kidney anoxia during the stage when the circulation is embarrassed ; some is toxic in origin. Encouragement of normal renal function is now an essential part of the post-operative treatment of the wounded.

The importance of a neurogenic element has always to be borne in mind. An ordinary faint is the simplest form of neurogenic " shock " and may be brought about by painful stimuli, with or without injury, or by mental stress ; these initiate a reflex mechanism, manifesting itself by a low blood-pressure and a slow pulse. This condition may be a complicating factor with oligæmic " shock " and cause sudden death, for example if a fracture be roughly handled.

*The Development of Transfusion.*—It was appreciated at the outset of the war that the demand for blood, as judged by civil standards, would be phenomenal. Attention had also to be devoted to the production of blood substitutes, particularly for use in tropical climates, and to the devising of an expendable apparatus for administration which could be used under all field conditions. Account had also to be taken of the perishable nature of blood, the meticulous care which was required to ensure its proper preservation and of the disasters which would follow the use of blood of the wrong group or blood which was infected or degenerate.

Much research was devoted to these problems, such as the prolongation of the storage period of blood (Bushby *et al.*, 1940), the perfection of methods for filtering plasma (Bushby and Whitby, 1942) and of methods for drying plasma (Lanyon, 1941). Much thought and ingenuity had to be given to the essential problem of refrigeration in the field (Lanyon, 1945). As a result of the work, supplies of all kinds were always abundant and were freely used on an ever-increasing scale. This can be seen from the comparative records of different campaigns (Tables I and II). Despite difficulties, the number of transfusion accidents was negligible, and no major disaster occurred, whilst the incidence of reactions was lower than that reported from civilian sources. In the later stages of the war, by reason of supplies, transfusion was a weapon which could be used without restriction.

*The Art of Transfusion.*—Transfusion is not a mechanical procedure requiring nothing more than a pretty skill in vene-puncture, though this last is essential and is best learned in the hard school of routine blood collection. The art of transfusion lies in the selection of cases, the choice of correct fluids and their administration in appropriate volume at an optimum rate. Until the more elaborate methods of laboratory control have been reduced to bedside procedure, reliance has to be placed upon clinical judgment of the individual case : here the trained and experienced transfusion officer has paid a handsome dividend for his training ; he frequently could obtain a desirable result with far less material and considerably less anxiety than his less experienced colleague.

As to selection of fluid : there have been many swings of the pendulum of opinion. Some have stated dogmatically that when blood is lost, blood is essential. Others, equally dogmatic, maintain that results just as good can be obtained with plasma or serum, despite their lack of oxygen-carrying power. The broad answer, as always, is intermediate and much depends upon the individual case as well as upon the nature of what is available. Here, one can do no more than indicate certain principles which should guide selection. The vital requirement in the majority is volume restoration. This can be accomplished with either blood, plasma, or serum. At the same time, a man will stand an operation far better if his hæmoglobin is not below 60 to 70 per cent. A judicious mixture of blood and plasma will achieve this. And there is a great difference between fresh blood (rarely obtainable in a forward area), young stored blood and old stored blood. If only the last named is available, it is certainly not advisable to give huge quantities (part of which is inevitably hæmolyzed, and so releases pigment into the circulation) to those who are potential candidates for renal failure. And, again, the impression at one time prevalent that abdominal wounds required huge quantities of blood has been contradicted by Grant's (1945) precise laboratory-controlled work, which has shown that the main danger is plasma loss rather than blood loss.

Saline infusion has also become more widely practised, partly as the result of experience, partly from American influence.

The volume to be administered and the rate of administration are individual matters. Most medical officers know that massive limb injuries may require large volumes, five or six pints as a pre-operative measure, but some are still diffident of administering at a fast rate. Anyone who has suffered a blood loss serious enough to demand instant transfusion, unless the injury is to the lung, cannot have the first three pints administered too fast. Unless the rate is fast, the response is often delayed and disappointing. With these, too, transfusion should not stop in the pre-operative ward; operation and the post-operative phase need to be supported, otherwise many deaths occur.

In principle, once a response has been elicited, the later transfusions are given in a volume and at a rate appropriate to the general condition. Of great importance is an appreciation of the urgency of surgery when tissue damage is massive. These cases can often be no more than partially restored by pre-operative transfusion. When this is so, when the patient seems to hang fire despite continued transfusion, then his only chance of life is to take the risk of immediate operation with a transfusion in progress. Likewise, with gross infection. Until the cause, the toxic focus, has been removed, little response to transfusion can be expected. Judicious transfusion has also a great place during convalescence, but in this field there have been more difficulties and tragedies than in the forward areas where the acute phase is handled. It is certainly desirable that the deliberate work of a back area should be carried out with fresh blood of appropriate group, with intra-group incompatibility (Rhesus factor, etc.) carefully excluded. A so-called "pep" transfusion, made with somewhat old Group O blood, in which the immunizing potentialities of previous transfusions have not been excluded, has occasionally and unnecessarily cost a life.

*Failures, Disappointments and Disasters.*—Enough has been said to show that transfusion is not a mechanical procedure and that, in some apparently straightforward cases, surgery may have to take precedence over complete response. Supplies have been so abundant that, at one phase of the war, a wounded man was almost lucky if he escaped a transfusion, and a number of unsuitable cases were undoubtedly submitted to the operation. Injuries to the brain and central nervous system respond poorly; unless there are serious injuries elsewhere, such cases are best left alone. Bone injuries now carry a risk which is recognized as relatively common; this is the precipitation of fat embolism, which should be suspected whenever unexplained pulmonary or cerebral symptoms arise during the transfusion of a case with a bone injury. The transfusion should be stopped, as it tends to increase the amount of fat in the circulation; immobilization and rest are the only effective remedies.

Certain cases should never be transfused. These include thoracic injuries with an embarrassed circulation from hæmopericardium or other mechanical causes, and injuries to the lung alveoli from blast or irritant gases. Indeed, the transfusion of any chest injury should be undertaken with caution on account of the danger of pulmonary œdema. With modern projectiles, some degree of blast injury is not uncommon. When there are prominent injuries elsewhere, blast lung may easily pass unobserved until pulmonary œdema occurs. The diagnosis can often be supported by finding a ruptured tympanic membrane. Disasters from incompatible blood have been almost unknown. This is a tribute to the complete group-checking system which was rigidly enforced, whereby both agglutinin and agglutinin content of all Group O blood was carried out before release. Trouble has occasionally arisen from the use of massive quantities of somewhat old blood (*supra*) but the boggy of infected blood has appeared on only four small occasions, despite the fact that the armies have operated in all climates and under most difficult conditions. This again is a tribute to the efficiency of the technique of blood collection, transportation and storage under field conditions, as well as to the *esprit de corps* of the Service which permitted no carelessness or slackness in the handling of a potentially dangerous fluid.

*Some Facts and Figures.*—The records of all Forces have not yet been completely analysed, but the figures in Tables I and II give some idea of the supplies which had to be obtained and the extent of their utilization. The most constant fact, from all theatres, is that approxi-

mately 10 per cent of wounded required to be transfused ; this also was the figure found for air-raid casualties in this country.

TABLE I.—UTILIZATION.

Theatre and period	Wounded admitted	Number transfused	Per cent transfused	Fluids used (pints)		Average per case (pints)		
				Blood	Plasma	Blood	Plasma	Protein
8th Army M.E.F. (Forward Areas)	11,732	1,119	10	2,171	1,323	1.9	1.2	3.1
1st Army B.N.A.F. (Forward Areas)	16,674	1,604	10	1,084	4,000	0.7	2.5	3.2
C.M.F. Anzio : 1944 (Forward Areas)	3,904	414	10.6	1,305	491	3.1	1.2	4.3
B.L.A. (a) Forward Areas :	129,680	15,148	12	39,057	29,495	2.6	1.9	4.5
(b) Back Areas :		9,468	7% retrans-fused	12,680	10,917	1.3	1.1	2.4

NOTES.—38 per cent of the cases transfused by B.L.A. required 4.5 pints total protein per case.  
62 per cent of the cases transfused by B.L.A. required 6.9 pints total protein per case.

The variation in the amount of blood or plasma used in the average case is partly a function of the supplies available and partly dictated by the prevailing fashion. It will be seen that the average total protein requirement is about 4 pints per case and that, in the most experienced force—the B.L.A.—this was made up of approximately  $2\frac{1}{2}$  pints of blood and  $1\frac{1}{2}$  pints of plasma, so far as the acute phase of the wounding was concerned. In the B.L.A. there was a considerable amount of transfusion work at General Hospital level as well as in the forward areas.

As to the supplies provided (Table II) : there was no period of the war in which the demand ceased to be on an increasing scale, culminating with a figure of 124 pints of protein fluid and 134 pints of crystalloids for every hundred wounded in the B.L.A.

TABLE II.—SUPPLIES.

Force and period	Total wounded	Blood	Plasma fluid and dried		Supplies per 100 wounded		
			Crystalloids	Crystalloids	Blood	Plasma	Crystalloids
M.E.F. 1940 to June, 1943	63,190	10,379	41,383	57,399	16	65	91
B.N.A.F. 1942-43	16,674	1,094	5,000	5,000	6	30	30
C.M.F. Aug.-Sept., 1944	14,580	7,480	9,507	17,630	51	65	121
B.L.A. June 3, 1944, to May 31, 1945	144,649	90,975	88,653	193,948	63	61	134

This is eloquent testimony to the inevitable waste of war. That such supplies were freely given without question is a tremendous tribute to the magnitude and constancy of the public effort, typified by the ordinary civilian blood donor, which gave to our wounded the 80 to 90 per cent chance of life which they enjoyed.

## BIBLIOGRAPHY.

- BUSHBY, S. R. M., KEKWICK, A., MARRIOTT, H. L., and WHITBY, L. E. H. (1940). *Lancet*, 2, 414.  
 BUSHBY, S. R. M., and WHITBY, L. E. H. (1942). *J. Roy. Army Med. Corps*, 73, 255.  
 CONWAY, H. (1945). *Lancet*, 2, 206.  
 GRANT, R. T. (1944). Personal Communication.  
 Idem (1945). Report to Medical Research Council.  
 GRANT, R. T., and REEVE, E. B. (1941). *Brit. Med. J.*, 2, 293.  
 KEKWICK, A., MAYCOCK, W. d'A., MARRIOTT, H. L., and WHITBY, L. E. H. (1941). *Lancet*, 1, 99.  
 LANYON, E. C. G. (1941). *J. Hygiene*, 41, 111.  
 Idem (1945). Modern Refrigeration, Feb. 15.

## ORTHOPÆDIC LESSONS OF THE WAR.

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[Received November 16, 1945.]

"ORTHOPÆDIC surgery is based on, and consists of, the recognition and practice of definite principles of treatment—whether operative, manipulative, or educational—which lead to the restoration of function in deformed or disabled limbs or muscles."—Sir Robert Jones.

### ORGANIZATION.

In 1939 and in the pre-war planning the Army possessed no orthopædic service and the organization developed with such success by Sir Robert Jones in the last war had fallen into abeyance and was forgotten.

The Army was finally prevailed upon to recognize orthopædic surgery as a specialty in May, 1940, and in October of that year published a memorandum on the disposal of orthopædic cases and defined what was embraced in that term, viz.: (a) Fractures; (b) deformities of the extremities and spine; (c) diseases, derangements and disabilities of joints; (d) injuries to peripheral nerves.

Orthopædic surgery, then, from the Army standpoint, cannot be regarded as a circumscribed specialty comparable to ophthalmology, neuro-surgery or thoracic surgery, but is rather one of the two main divisions of surgery, embracing some 50 per cent or more of the whole field. It shares, in common with all surgery, in the benefits which have followed early wound closure, the efficient transfusion service and the use of the bacteriostatic drugs and penicillin.

### ORTHOPÆDIC CENTRES.

These units were first established in M.E. and were attached as limpets to a parent hospital. Their W.E. consisted of: One surgeon—full specialist and O.C. of the unit with rank of Major; one surgeon—full or "graded" specialist; one plaster-room attendant; one clerk; one batman; one Sister; eight masseuses; three occupational therapists.

Later, in the C.M.F., the Sister and the batman were disallowed. It was a pity to lose the Sister, a necessary member of the team when continuity makes for efficiency, but Sisters were in short supply.

The Centre was usually attached to a 1,200 bedded base hospital and often expanded so that, at one period in North Africa with a surgical division expanded to 1,600 beds, 800 of these were orthopædic.

For administrative reasons in B.L.A. and in S.E.A.C. the Centres as such were dropped, and the orthopædic surgeon was appointed as one of the optional specialists attached to a hospital. This scheme may work for an army based on U.K. and fits in quite tidily with a W.E. making for simplicity, but it is not an efficient substitute for the Centre and, in any event, for any army not based on U.K., the Centre as formed in M.E. is by far the better arrangement.

Orthopædic work does not consist merely of operating. The ward routine must be supervised by the surgeon and his trained staff—for this reason alone the fact that the Centre has two surgeons is of inestimable value. One man cannot do the operative work and supervise the patients in his wards, looking after 100 or more fractured femurs in balanced traction, in any busy period.

If the orthopædic service of the Army is to be efficient as it was in M.E. the Centre should be retained in W.E. and a Sister and an anæsthetist added over the C.M.F. allowance. Then a



Centre can serve a district and take care of the serious injuries, whilst at the same time, if suitably placed geographically, the out-patient department, which it should organize, will effect a great saving of man-power by the modern and specialized treatment of the minor injuries by men skilled in their management. With a base in U.K., a short line of evacuation and a daily air service, the Centre can be in U.K. but daily air service does not hold in winter and often not even in summer. With a convalescent wing and a convalescent depot, two necessary adjuncts, the Centre will prove its worth. From an experience of both types, and from evidence from many orthopædic surgeons, I am convinced that it would be wise to restore the Centre, with its M.E. establishment, for an Army of Occupation, when any considerable number of troops is employed.

#### SEGREGATION OF PATIENTS.

In general, segregation has been carried out in all theatres in accordance with the memorandum quoted above, but when the bulk of this material is great and the orthopædic centres overcrowded, it is obvious that in practice many patients must be treated in the general wards of a hospital.

The value of special centres is universally acknowledged. The major fractures and joint injuries, intensively studied, stimulate the surgeon to produce a higher standard of treatment than is possible if his interests remain "general." His assistants, orderlies, nurses and physiotherapists all form one trained team. The technical skill, which has been displayed in treating these major injuries—labelled orthopædic—is at least as specialized as that shown in the treatment of a facio-maxillary wound or a chest wound, although the necessary knowledge is perhaps more widely disseminated.

#### CLINICAL PROBLEMS.

Turning to the clinical problems, perhaps the most dramatic and outstanding advances are seen in the treatment of the open fractured femur and of penetrating wounds of the knee-joint, but there has been a great advance in the general appreciation of the value of early movement, and the prevention of avoidable stiffness due to injudicious splintage, which is most noticeable in dealing with injuries of the hand and to a less extent of the foot and spine.

Emphasis was, of necessity, laid on the importance of restricting splintage of the hand and fingers to a minimum, and no plaster or splint was advised which extended on the palm beyond the proximal palmar crease. It was common to find that flexion at the metacarpophalangeal joints was unnecessarily interfered with, especially when plaster was used to control the wrist or immobilize a fractured scaphoid.

In fixation of the foot, the common mistake which was made was fixation in equinus or varus or both. A distinguished surgeon at a pensions hospital told me that all the patients who reached him had one foot immobilized in varus and, although granted he only saw the worst cases, the failure to fix in the correct position was all too common. This malposition of the foot must be constantly watched for and guarded against. The orthopædic consultants and advisers in the various theatres were always on the lookout for overfixation in the hand and faulty position of fixation in the foot, and it is fair to say that there was improvement in both instances largely as the result of their efforts. I met one surgeon in North Africa with a series of fractures admirably treated except that all the feet were with intent immobilized in varus. In discussing the position, he told me that this was his practice and he was following what he had been taught.

It cannot be emphasized too often or too strongly that a foot fixed in varus is a disaster and that the ankle must be at a right angle.

There has been so far little, if any, improvement in the results following peripheral nerve injuries, and the successful treatment of the fractured scaphoid is another clinical condition which still, to some extent, eludes us.

Very early in the war it was recognized that operations for toe deformities seldom paid dividends—such operations were frequently carried out in the quiet period of 1939 and early

1940 by many surgeons for hallux valgus or rigidus. An instruction was issued that these operations were only to be performed on the advice of an orthopædic specialist and the orthopædic specialists themselves agreed that only in exceptional cases, e.g. for a key man, should they be done in the Army. A similar instruction was issued to stop haphazard operation for internal derangement of the knee. In my experience both these necessary technical instructions proved a real advance. Surgeons do not like being told that such and such an operation, which they are accustomed to carry out in civil life, is barred in the Army, but they took it in good part and that this so speaks volumes for our many colleagues and friends on the general side.

#### FRACTURED FEMURS.

In eleven months in B.L.A. there were 2,364 fractured femurs, with a mortality of only 4.6 per cent in the first fourteen days. The C.M.F. figures were comparable. The advance in treatment was a triumph of the surgical effort.

The accepted routine consisted of first-class forward surgery, the almost universal application of the Tobruk splint, and evacuation to an orthopædic centre. It is of interest to note that the American surgeons favoured the plaster spica, whilst the Canadians largely gave up the spica and followed the British practice. The American use of a half-ringed Thomas was one reason why they found difficulty with the Tobruk and remained faithful to the plaster spica which we gave up almost entirely.

The delay between wounding and arrival at the Centre necessarily varied—three or four days being common but in some instances eight to ten days elapsed. The Tobruk was removed and the wound inspected *only* in the operating theatre and the wound closed if possible. The fracture was treated generally by balanced traction by weight and pulley, sometimes with fixed traction, rarely by internal fixation.

The first group of patients whose wounds were closed when complicated by a fractured femur were operated on at No. 17 Orthopædic Centre at Caserta by Major Furlong who worked in close collaboration with Lieutenant-Colonel Jefferies of the penicillin team. The majority of patients were given a full parenteral course of 750,000 units of penicillin after delayed primary suture and most patients were also given blood in the first few days, the importance of maintaining the hæmoglobin concentration being early recognized. Excellent work was done at the other centres and Major Barbara Stimson reported a successful series at the Surgical Conference in Rome.

The method of internal fixation by a stainless steel or vitallium plate was given a trial in certain centres in Italy. There is general agreement that plating should not be carried out at the same time as delayed primary suture, nor for an infected fracture. At Major Stimson's Centre only 29 femurs out of a series of 290 were plated and many of these were simple closed fractures. The use of plates was only permitted at certain centres, because the success of plating is largely a matter of training and experience, a careful selection of cases and a faultless technique. The method has not a wide scope in war surgery, although at the final Base it has its place, and has come back into favour particularly in fractures of the tibia and the forearm bones.

The Kuntschner nail, used by the Germans, a stainless steel nail used as an intramedullary fixation, is a late product of the war and a re-discovery of a method used by the late Professor Hey Groves in the last war. The method has a place in the handling of certain difficult fractures and although not as yet widely known, will probably form the basis of articles in the medical press at no distant date. The results so far in selected cases are encouraging and combined with chip grafts may prove useful in dealing with certain ununited fractures of the femur, particularly in the difficult upper third fracture.

Up to the present the final end-results of fractured femurs are difficult to assess with accuracy; indeed, the difficulty in any final follow-up is only too evident and one can only speak from impressions but, by and large, the femur results are good, with limitations of knee movement as the most serious complications.

## GUNSHOT WOUNDS OF THE KNEE-JOINT.

Here again the advance in treatment borders on the miraculous. In M.E. and in North Africa before the days of universal penicillin, pyarthrosis was not uncommon. In M.E. in 1941-42, Buxton reports 273 penetrating wounds of the knee with a mortality of 2 per cent and 34.8 per cent suppurative arthritis.

It is notoriously difficult to drain an infected knee-joint, and most surgeons agree that posterior drainage is ineffectual. Drainage is best secured by lateral incisions on either side of the patella, fixation in a plaster spica and nursing on the face, thus ensuring that drainage is dependent.

In B.L.A. in eleven months, there were 1,365 penetrating wounds of the knee-joint, with a 1 per cent mortality in the first fourteen days. Pyarthrosis was rare. Burns and Young from an E.M.S. hospital reported the intermediate results of 101 cases, with no deaths and no amputations, which happy result they ascribe to the use of penicillin. In this series, suppurative arthritis was not only less common but also much less severe. All the wounds, excepting five, were healed in six months.

There is, however, another aspect of penetrating wounds of the knee which must be considered and which has not been discussed, and that is the final functional result.

A knee wounded by a missile and without bone involvement which is sutured and which heals without obvious sepsis should make a full functional recovery. It behaves much as a clean operation wound. Experience shows that rehabilitation must not be hurried. Three months will be needed before hard active work is undertaken. Just as in the rehabilitation following meniscectomy, if the physical treatment is pushed too fast, too early and too vigorously, the full functional recovery is retarded.

At the other end of the scale is the knee with gross damage to a femoral condyle or tibial tuberosity which heals without suppuration. Here the true end-result as regards function must be poor. These knees come to arthrodesis, unless the patient leads a very sedentary and sheltered life.

It is an axiom that gross interference with a weight-bearing joint destroys for all time the function of that joint.

Between these two extremes is the knee with minor damage to the weight-bearing surface, and here the results will differ. If a part of the articular cartilage is destroyed, the joint cannot regain 100 per cent function, but many such joints last for years just as do some of the joints where the cartilage has been eroded as in osteo-chondritis dissecans. Some such joints it is said last for ten or twenty years; some show the changes of degeneration (osteo-arthritis) in a year or even less.

The improvement, then, in knee-joint surgery lies rather in the saving of life and limb than in any particular advance made to safeguard ultimate function, which is outside the surgeon's control, excepting in so far as injudicious manœuvres may do harm.

## EARLY MOVEMENT.

Many surgeons are still not convinced that early knee movement is necessary in treating a fractured femur, but there can be no two opinions about its value in the management of injuries of the fingers and hand and, to a less extent, the foot.

There has been a great advance in treatment, both in the British and American Armies, from the appreciation of the fact that a splinted hand is likely to become a stiff and useless hand. It was common in the early days of the war to meet with hands immobilized in plaster following a fracture of a metacarpal or a phalanx. It was routine to immobilize the foot and leg following a fracture of the os calcis.

A fractured third metacarpal, for instance, splinted as it is by a normal bone on either side, requires protection but surely not an arm and hand and fingers encased in plaster of Paris. Yet this was a common phenomenon in the early days of the war.

The gospel of early movement for the hand and fingers was finally recognized, and its

appreciation has saved many limbs from long hospitalization and from disaster. It is one of the lessons which the orthopædic surgeons preached incessantly. In some hospitals when a patient left with his arm in plaster following an open fracture of the elbow, written on his plaster were the words: "Keep your fingers moving."

It should be put on record that the masseuses who served overseas played a big part in helping to carry out this policy of early movement and rehabilitation. The massage corps did grand work. They stimulated and encouraged patients to try to use their muscles and joints in a way which the overworked M.O. could not do, and just as the Nursing Sisters are deservedly praised for their work in forward areas, so should the physiotherapists work be equally acknowledged.

Early movement improved the results of the os calcis fracture, never so common as in this war as the result of mine explosions. In the Centres, plaster fixation was generally given up and replaced by rest with the foot elevated on a Braun's frame for four weeks, with the fracture reduced as far as possible, and movement of the forefoot and midtarsus encouraged. No weight-bearing for some sixteen weeks became the standard method. Under the fixation scheme the disability of the fracture was complicated by the adhesions and joint fixation of the whole of the tarsal joints.

#### TRAINING OF SURGEONS.

From the foregoing paragraphs it will be seen that the trained orthopædic surgeon has much to offer in the treatment of the injured and the wounded. A large amount of the work he will be called upon to do is non-spectacular and time consuming and will be in the out-patients department, and it is here that his special training and experience in civilian practice will prove its worth in the saving of man-power.

During a war lasting some six years, the intake of trained surgeons becomes increasingly a diminishing quantity. The needs of the E.M.S. and the civil population are such that the Services are short of trained surgeons and trained specialists. An attempt was made in the Army to overcome this difficulty by training some of the younger men who showed promise but were not sufficiently experienced to be graded as surgeons on joining the R.A.M.C. Once a man had become recognized as a graded surgeon, and only then, he could if he so desired and if there were a vacancy be placed in an orthopædic unit to learn orthopædic surgery in the Army sense. You cannot train a surgeon and you certainly cannot train an orthopædic surgeon in the Army hospitals, but you can give him experience and an insight into the work which will make him a useful orthopædic surgeon from the strictly limited viewpoint of the treatment of trauma. Many young surgeons underwent this training and some qualified as specialists after being graded. Much of the work of the fully qualified orthopædic surgeon has but little scope in Army practice, e.g. the treatment of congenital deformities—of errors of growth and epiphyseal changes—of bone and joint tuberculosis—of bone tumours. This specialized knowledge may be of the greatest value in diagnosis but the treatment of these conditions has no place in Army hospitals in time of war.

But the other part of his work, the treatment of trauma and of its results, has a wide field of usefulness. He has much to contribute, too, on the preventive side—in checking the injuries and disabilities caused by injudicious training or by overactive rehabilitation.

In the post-war organization of the R.A.M.C., a well planned Orthopædic Section should form an essential part. In this war, both overseas and at home, it has proved its value

## SURGERY AT A CASUALTY CLEARING STATION.

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[Received November 7, 1945.]

WITH hostilities at an end, it is reasonable to hope that the need for casualty clearing stations, like the need for many other things, has ceased to be a practical concern, at least for the immediate future. But many of the lessons of war are too valuable to be forgotten altogether, and, for that reason, it is of interest to reflect on some of the factors which determine the success of surgery in the forward areas, in particular at a casualty clearing station. This is very much to the point, for the very existence of such a unit as the casualty clearing station is justified only if it succeeds in meeting the surgical requirements within such areas.

It is a mistake to imagine that the life-saving value of surgery is increased the nearer to the front line it is made available. Such a doctrine is only true up to a point and with certain reservations. Beyond that point, all the circumstances militate against good surgery—noise and other interruptions, lack of accommodation and all the general disorder and heightened tension which affect the immediate fringe of the combat zone. Such an atmosphere is not conducive to good operative work, nor is it one in which the nursing of gravely wounded men should be attempted. And, since it is an axiom that many serious cases travel better before operation than after, it is an obvious corollary that where the operation takes place there also must the post-operative nursing be provided.

Moreover, no unit of any considerable size can properly function far forward. This is dictated partly by the conditions prevailing there, but also by the fact that a unit so situated can only drain a relatively narrow front. Consequently, the surgical resources of a formation would necessarily be disposed in "penny packets," a policy which is no less unsound and uneconomical in the medical services than in other branches of the Army.

In the absence of unlimited medical man-power, the surgical requirements of any considerable formation, such as an Army Corps, are best fulfilled by a unit of fair size, mobility and adaptability, equipped to provide skilled surgery and skilled pre- and post-operative care. The unit should be so sited, in an area of relative tranquillity, that it is accessible from a wide front within the limits of time which largely determine the success of surgical treatment in those cases which have been categorized Group I and Group II. The C.C.S. is such a unit, and those are the principles which have governed its employment during recent operations. Admittedly, there were many occasions, for which *ad hoc* arrangements were required, and the problems of long or lengthening lines of evacuation are so characteristic of modern war that a more or less standard "drill" was developed, involving the establishment of smaller advanced surgical centres. A number of these circumstances were so consistently present during the desert campaigns that the surgical value of the C.C.S.s was called in question for a time. However, having been rendered rather more adaptable, the C.C.S. survived a period of unpopularity and re-emerged still the recognized main surgical centre for the forward areas.

The basic principles of surgery apply at a C.C.S. no less than elsewhere. There are certain circumstances, however, which are more or less peculiar to the C.C.S., because they are determined by the level at which the unit functions, a level at which the surgeon's natural pre-occupation is with gravely wounded men seen in a relatively early stage. These circumstances form the basis of what may be termed "local" principles, which must be recognized and observed if the best results are to be obtained. Broadly speaking, it may be said that these principles are a guide as to the surgical procedures, adequate to meet the immediate and essential requirements of the case at that stage, which also allow for the other

factors present, such as the existence of shock and hæmorrhage, the further transportation which will soon follow and the probable necessity in many cases of further treatment, perhaps highly specialized, to which the treatment received at the C.C.S. should form only an appropriate prelude. It is not proposed to consider the application of these principles to the several types of wound in the various parts of the body—penetrating wounds of the abdomen or chest, open fractures of the long bones, facio-maxillary or head injuries, and so on. Much accumulated wisdom will be found in the "Field Surgery Pocket Book," in the excellent memoranda issued from time to time by the Consultant Surgeons of the Army, and in papers published by many of those best qualified by experience to do so. "Not too little, not too much," is a motif which recurs throughout—"not too little" because immediate extensive surgery is the only chance of saving life in many cases; "not too much" because many cases are only starting on a long journey, both literally and metaphorically, in which an excess of zeal at the C.C.S. can make no useful contribution towards a safe arrival. But there must be no "tinkering." The surgeon must be quite clear and definite in his intentions. Where possible, his interference must be complete and final; if not, it must represent a definite stage in the patient's surgical progress.

The forward area provides no field for the surgical tyro, whose place is more appropriately with a Base General Hospital where his work can more readily be supervised and allocated in accordance with his limitations. This is not possible at the C.C.S. as the surgeon there must necessarily deal with every variety of war wound, notably the most severe and dangerous, and the most extensive. He sees such cases at a relatively early stage, when diagnostic features may be masked by the presence of shock or not yet developed because of the short lapse of time. He is faced with innumerable and complex anatomical problems, occasioned by the nature and extent of the injury, or by the necessity for an unorthodox surgical approach. The procedure which he adopts is frequently conditioned by the general state of the patient, by the post-operative facilities which he knows to be available on the spot, and by his ability to visualize the long chain of subsequent progress. He requires the professional insight which recognizes the chance, however slender, of preserving life or limb, and the courage, partly innate and partly born of experience, which sustains such optimism in the face of inevitable disappointments. Obviously, therefore, the surgeon selected for duty with a C.C.S. should be a man of known skill, experience and sound judgment.

It may be remarked, however, that while no inexperienced surgeon should feature on the establishment of a C.C.S. the practice of attaching "trainee surgeons" surplus to establishment has much to recommend it. Such an attachment should be made after a period with a General Hospital, not before, as the "trainee" will then be in a much better position to benefit from his C.C.S. experience. From the point of view of the C.C.S. the extra pair of skilled hands has always proved welcome, especially at rush periods.

Reference has been made to the relative tranquillity which should, by choice, characterize the site of a C.C.S. Such tranquillity as may be possible is at all times only relative, and during busy spells the atmosphere enveloping a C.C.S. can certainly not be described as tranquil. Hectic is the descriptive term which has been most commonly and correctly applied. It is during such periods that the abilities of the surgeon are most severely tested—not only his professional and technical skill, but also his entire personality and physical make-up. He must make decisions quickly. He is required to work fast and to maintain his high speed over long periods. All this entails very considerable physical and mental strain and, for this reason, the surgeon at a C.C.S. should be a relatively young man or, at all events, a physically fit man of robust constitution capable of repeated long spells in the operating theatre. In practice it has been found that few men can operate under field conditions for more than fifteen hours continuously without loss of speed and efficiency. The quality of performance deteriorates and errors of judgment creep in. And since the same factors of physical fatigue and mental stress affect also the efficiency of the theatre staff, it is essential that a roster of reliefs be maintained, providing for "shifts" of not more than twelve hours' duration for the entire surgical team, with twelve hours' rest between shifts.

During one such shift a team can deal with twelve to twenty cases. Of course, it has been necessary, on occasion, to depart from such a routine and to work continuously for a longer period, but such occasions should be of short duration. If the necessity persists, it must be considered that the resources are inadequate for the task in hand. Even during relatively slack periods, a similar time-table should be maintained, so that the routine becomes familiar and the mental and physical readjustments entailed by a busy period are minimized.

The success of the surgeon depends in no small degree upon the devotion with which he inspires the remainder of his team. Hence much of the importance of the example which he should be able to set in enduring the stress and strain of long hours in the theatre. Hence the importance of an equable temperament or, at all events, a temperament whose variations are of an endearing variety. Hence, in short, the importance of his character and personality, as distinct from his professional ability, in developing that team spirit which will overcome the difficulties of improvised accommodation, long spells of heavy work, relatively frequent change of location, the tedium and discomfort of road movement, and the other trials which are incidental to life with a C.C.S. It is not suggested that these trials are overwhelming by comparison with the other branches of the Service but they undoubtedly militate against good surgical results unless met and overcome in the right spirit. That spirit is present if the surgeon is also a good officer and leader. It should be added that mutual confidence and respect must exist between the surgeon and his anæsthetist. If not, then one or the other had better go elsewhere. Although the physical strain may be rather less in the case of the anæsthetist, he requires the same qualities of resiliency and adaptability as his colleague, and certainly his professional skill will nowhere be more highly tested than in meeting the requirements of surgery in a forward area.

Operating theatre accommodation at C.C.S. level has naturally been very variable. In fine warm weather a standard tented lay-out has much to recommend it. In such circumstances, the operating theatres are normally clean, fresh and convenient, though the possible advent of dust, rain, mud and high wind must be remembered. The absence of a running water supply is no very serious difficulty and, besides, it is not necessarily peculiar to tented accommodation. Black-out presents no greater problem in tents than it does in many buildings, but in cold or otherwise inclement weather, or when the stay in a location is prolonged, the disadvantages of a tented operating theatre become apparent, and the possibility of indoor accommodation must be considered. At best, it has been possible to take over the surgical facilities of a civilian hospital. Much more frequently, however, it has been necessary to establish the operating theatre in the drawing room of a château, or in a school-room, or in a barracks, or in a convent, or in a factory. Adequate space and accessibility are the essentials, with, if possible, a convenient running water supply and a suitably situated sterilizing room. Much cleaning has often been necessary, and the theatre staff should be able to distinguish between apparent cleanliness and surgical cleanliness. Conversely, the surgeon and his team must not be dismayed by the dingy walls, provided they are satisfied with the surgical cleanliness of the improvised theatre. Though many of the amenities of civilian practice may be lacking, their absence must not be allowed to induce a carelessness or contempt for essentials. The surgeon himself is not so liable to fall into this error, but his orderlies may well do so, and it is a tendency which must be guarded against at all times.

The present establishment of a C.C.S. includes one surgical specialist, one graded surgeon, one specialist anæsthetist, one graded anæsthetist, and two operating room assistants. It is possible, therefore, to form two teams each comprising a surgeon and anæsthetist, and one operating room assistant, with usually two nursing orderlies completing the team. It has been customary to refer to these teams as the heavy and light sections respectively, but the distinction is of no great significance as either team should be able to function independently if required. If, as seems desirable, the present field dressing stations are scrapped, it would be an improvement to increase the number of surgical teams with a C.C.S. to three, to strengthen them by making them identical with the present field surgical unit teams, and to provide for a detachable light section, complete with nursing orderlies and nursing Sisters, cooks, etc.

In general, the equipment has proved suitable and adequate, but it has not been possible to equip the two teams identically from the present authorized equipment of a C.C.S. While this has not caused insuperable difficulty, the advisability of identical equipment might well be considered if the present establishment is to be maintained. The practicability of borrowing is small if both teams are working at the same time, and ceases entirely if they should be working at separate locations, as has happened. The duplication need not affect the less common or more elaborate instruments or apparatus, which one would regard as a reserve for occasional use in special cases.

Relying on its own establishment, therefore, the C.C.S. can, with two teams, deal in twenty-four hours with about twenty-five cases demanding major surgical treatment at that level—abdominal and thoracic wounds, severe compound fractures, amputations, extensive or multiple injury to soft tissues and cases in which the danger of hæmorrhage persists—plus a certain number of cases which should have minor treatment before onward transportation, such as toilet of head wounds and facio-maxillary injuries or suprapubic drainage in the spinal cases which require it. Since all such cases have formed about 15 per cent. of the total casualties, it follows that the surgical capacity of the C.C.S. is adequate only if the number of daily arrivals does not exceed about two hundred. Indeed, even for such a number of admissions it is desirable that the surgical potential be increased, and in practice a C.C.S. has rarely functioned without additional teams in the shape of field surgical units. The number of teams thus made available has varied with the anticipated requirements and should permit of the relief “shifts” already stressed as being of importance. If heavy casualties are expected, eight teams will not be too many, and this number has been reached and exceeded in both the North African and North West European Theatres of War. In this way, an admission rate approaching one thousand daily may be provided for, at least in theory, though the results will be satisfactory only if the pre- and post-operative facilities are correspondingly increased.

This latter observation brings us to a consideration of the organization built around the surgeon and his team. The surgeon cannot attempt to see all cases arriving at the C.C.S. and the responsibility for selecting cases has therefore devolved upon the officer or officers in charge of the reception area. If waste of time and effort is to be avoided, these officers must make their decisions quickly and confidently, and with practice most of the triage officers have proved amazingly expert. The doubtful case must, of course, be referred to the surgeon, but such a course should not be adopted simply as a means of shifting responsibility. A large number of “doubtful” cases referred for opinion has usually meant unwillingness or inability to accept responsibility in the reception area, with a consequent misuse of the surgeon’s time. On the other hand, the reception officer should not be too rigid in his criteria, because the type of case selected for operation at the C.C.S. will vary to some extent with the circumstances of the moment. During relatively slack periods, a higher proportion of Group III cases can and should be dealt with by the C.C.S. in the interests both of the patient and of the General Hospital staffs in rear.

It has rarely been possible or desirable to pass even the serious casualty direct to the operating theatre. He has normally been sent from the reception area to a pre-operative ward, where the surgeon may make his examination and decide on priority. Here, too, the patient must be prepared for operation, and the pre-operative ward has been the main sphere of activity for the transfusion officer and his team. This team may occasionally be formed from C.C.S. resources, but these are fairly slender and an attached field transfusion unit has been regarded as essential. Its importance need not be stressed. The better the condition to which the patient can be raised before operation and the greater the accuracy with which the optimum time for operation can be gauged, the greater will be the operative possibilities and the brighter the patient’s prospects. Again, one must record that the skill and judgment developed by the transfusion officers and their teams have been extraordinarily high. From the surgeon’s point of view, if he can have complete confidence in his transfusion officer, he need spend less time and concern on the pre-operative ward.



Finally, it must be stressed that, in an appreciable proportion of cases, a good surgical result and even survival has been determined as much by the post-operative nursing as by the procedure adopted in the operating theatre. It is therefore in no way derogatory to the skill of R.A.M.C. nursing orderlies to say that the presence with the C.C.S. of trained nursing Sisters, of suitable age and temperament, is of prime importance. The number of Sisters allocated to a C.C.S. is eight, but this was increased to ten when possible and, though nominally only attached, the wise policy was adhered to of regarding them as an integral part of the C.C.S. establishment and changing them as little as possible. Opinions have differed as to whether theatre Sisters should be appointed from their number. But the male operating room assistants have shown themselves capable of carrying out the theatre duties most excellently, and the professional skill and judgment of the Sisters is definitely of greatest service in the post-operative wards, where their value has proved inestimable. Similar considerations should apply when the nursing strength of a C.C.S. is to be increased in anticipation of really heavy casualties. It is possible to do this by adding a field dressing station along with the extra field surgical units. But it is better, when practicable, to make two C.C.S.s available on the same or adjacent sites, if only because, by doing so, the number of fully trained Sisters is thereby doubled.

#### SUMMARY.

The Casualty Clearing Station has remained the main surgical centre for the forward areas, although the recurring need for smaller mobile advanced centres is recognized.

At C.C.S. level, the surgeon deals mainly with Groups I and II cases, and the extent of his treatment may be summarized to some extent by the maxim "not too little, not too much."

As well as possessing sound professional qualifications and experience, the C.C.S. surgeon should be physically well-endowed and psychologically adaptable to the conditions prevailing in the forward areas.

The surgical potential of a C.C.S. has varied according to the anticipated requirements. This variation has been achieved by adding an appropriate number of field surgical units.

While the operating theatre has naturally been the focal point of C.C.S. activity the success of surgery depends largely on the organization built around the surgeon and his team. In this connection, the presence of fully-trained nursing Sisters in the post-operative wards is of prime importance.

## THE TOBRUK PLASTER.

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THE Tobruk plaster is basically so simple that any attempt to trace its origin would be highly controversial. It consists of an attempt to immobilize the lower limb by a combination of a Thomas' splint and plaster of Paris bandages, a method which was doubtless used in the last war at any time after the Thomas' splint was introduced.

In this war the method was used extensively during the latter part of the siege of Tobruk, and since then the name has stuck. It has been used in every subsequent campaign and is now regarded as the method of choice for early lower limb fixation.

It is the purpose of this article to indicate the reasons for its use and some of the modifications through which it has passed before it reached its present form in the C.M.F. and the B.L.A.

In October, 1941, the Australian troops, who formed a large part of the garrison of Tobruk for some six months, were replaced by a British Force and No. 62 B.G.H. relieved No. 4 A.G.H. The journey up from Alexandria on Destroyers and the disembarkation via wrecked vessels moored to damaged jetties gave some idea of the difficulties which would be encountered in the evacuation of casualties, and the division of the hospital into four sections further complicated the situation.

The factors, therefore, which encouraged us to experiment with this type of immobilization were, first, the length of the L. of C. and the physical strains and stresses to which patients were subjected and, secondly, the fact that no proper medical attention was possible during the journey to the Base for a period of two to four days. Indeed, such was the press of work on the personnel of this 600-bedded hospital working without Sisters that, except in a few selected cases, little post-operative supervision could be undertaken. In sixteen weeks approximately 16,000 patients were admitted, 10,000 were evacuated and 2,500 operated on.

Before the relief, Destroyers could only reach Tobruk on thirteen days out of every twenty-eight, when there was no moon, and during this period it was essential to clear the hospital. In spite of this policy up to 2,000 patients were frequently accommodated. On the morning of "E" day all stretcher cases were assembled in an underground building in the docks. This was filled with three-tiered bunks on which the stretchers were placed. At about midnight, in absolute blackout, the stretchers were carried out by the bearers, generally the personnel of a native pioneer corps, and placed on the decks of the Destroyers. This operation had to be completed in about forty minutes, and there the patients remained until they arrived at Alexandria some twelve hours later. They were then dispersed by ambulance or hospital train to the various base hospitals. After Tobruk was relieved the Destroyers were replaced by hospital ships, but as these could only come to within half a mile of the shore the patient's passage was not much easier. Stretcher cases were loaded on to the ship's boats which were then towed out, hoisted up in the davits and there unloaded before returning for "fresh cargo." The hospital ship took some forty-eight hours to get back to Alexandria as opposed to the Destroyer's twelve hours.

No Thomas' splint without frequent adjustment will remain effective under these conditions. General Monro, then Consulting Surgeon, M.E., had noted this during the road evacuation from Mersa Matruh in the previous year and had suggested that some combination with P.O.P. would be more effective. Lieutenant-Colonel Littlejohn, officer-in-charge surgical division of No. 4 A.G.H., who had himself relied principally on spicas, was coming to the same conclusion.

Very few Thomas' splints were available, but there was an unlimited number of Italian pattern splints, which consist of a half ring and a fixed metal foot-piece; these are ideal for the combined method. Our first method consisted of attaching adhesive strapping to the leg, enclosing the limb in plaster, attaching the extension to the bottom of the splint and fixing the limb into the splint with a further turn or two of plaster. The disadvantage of this method was that the pull on the leg shifted the limb inside its plaster case and was apt to produce sores around the ankle-joint. Next we encased the limb in an unsplit plaster cast and fixed this to the splint by means of further plaster bandages. No patient treated in this way was evacuated for a minimum period of four days to make sure that no swelling of the foot was occurring. The resulting immobilization was extremely effective; no adjustment of any sort was necessary and I think for the Destroyer type of evacuation this was ideal. Later, when hospital ships were being used and some amount of supervision and adjustment was possible, we returned to the strapping extension and surrounded the whole limb outside the splint with plaster bandages.

The final of "Märk 4" model as used in later campaigns is a modification of this last method. In this the Thomas' splint is applied in the ordinary way. The malleoli are protected by felt and plenty of cotton-wool padding is placed between the limb and the bars of the splint. Six-inch plaster bandages are put on in loose turns from just above the felt cuff to the ring of the Thomas' splint. These are moulded closely to the outer side bar. The ring of the splint is kept in firm apposition with the tuber ischii by an upward and outward pull while the plaster is being applied and until it has set. The foot is supported with a well-padded plaster slab and, when travelling, the splint is tethered securely to the top and both sides of the stretcher suspension bar and down to the stretcher itself.

## THE FUTURE OF SURGERY IN THE ARMY.

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THE future of surgery in the Army is a subject which would seem to comprise consideration of how far the recent great necessary developments of surgery within the Army can be perpetuated in peacetime, how future surgical specialists might be selected and trained, and how the surgical lessons of this war may be remembered.

Surgery in the recent war as compared with that of the First World War became more specialized in two ways. It was performed to a much greater extent by surgeons with a proper surgical training; admittedly, it was sometimes only a war training but it was none the less a training, and surgery by others was more actively discouraged. Secondly, although there were some similar *ad hoc* trends in the First World War, there has been in this war the new establishment of ancillary specialist field teams in neurosurgery, chest surgery, facio-maxillary surgery, and orthopædic surgery.

In this country, civilian surgery has fallen largely into the hands of those who practise that art and craft and no other. The whole tendency is for it completely so to do, and not only that, but whatever arguments may arise as to the merits or demerits of further specialism, it is generally agreed that operative forays into the more difficult and complicated field of a specialty not usually practised by a surgeon are to be deprecated.

The future of Army Surgery in peacetime, in respect of this extra specialization which, it must be conceded, is a necessity towards a high standard of work, might at first sight seem to depend largely on whether a large or small standing Army will be necessary. Two items, however, qualify this. The first concerns the age-groups encountered. Soldiering is a young man's occupation and the unfit are not enlisted. The material for which all these special teams would cater would not be large in peacetime, even if the standing Army were large and concentrated. The second qualification is that the standing Army may not be concentrated but dispersed and, were several of each such specialist teams in being, they would each get even less material, not enough to keep them to any really high standard.

These ancillary specialist surgical teams, therefore, with some qualifications to be expressed later, can hardly be expected to continue. Apart from the specialist entities of ophthalmic and ear, nose, and throat surgery, it is unlikely, in the absence of any great United Services Hospital—a project mentioned later—that the higher administration will foster specialization beyond that of the all-round Army specialist surgeon. For, with the great development of air transport, it is getting easier and easier to transport the unusual type of case—that with a cerebral tumour, with a neoplasm of lung, with a condition requiring plastic surgery, and so on—to the civilian specialist, who, with a wider range of population and age-groups to draw from, has the experience, the apparatus, and the trained team.

So much for the extra specialties. What are the conditions met with by the Army surgeon in peacetime? Let us omit consideration of ophthalmic and of ear, nose, and throat surgery; there will be enough material for those who deal in these. These apart, the conditions met with are: (1) Traumatic conditions; chief of these are fractures of the limb bones. (2) Orthopædic disabilities; these are mainly minor in degree. (3) Acute abdominal conditions. (4) Hernia and hydrocele. (5) Varicose veins. (6) Surgical infections. (7) Gynaecological conditions in the wives of serving soldiers and in the A.T.S. (8) Children's surgery, in limited amount. (9) Minor surgery of all kinds.

At first sight, and especially to a young surgeon, this may not appear a very attractive

catalogue. A little reflection, however, will show that these conditions comprehensively afford a quite considerable scope and range and form a real specialty, not a regional specialty but an occupational and age-group specialty, a specialty in the main cutting horizontally across the vertical specialties of civilian surgery.

When one considers also how unsatisfactory the treatments afforded for several of these conditions have proved in relation to the strains imposed on young active people, it is apparent that there is room for plenty of sound surgery and valuable clinical research. But the surgeon must be given plenty to do; a steady but not oppressive pressure of work brings the best out of a surgeon. It should, with the help of air transport, be possible to do more in the way of collecting cases into larger centres in which there would be the stimulus to a surgeon of working alongside others. The lone surgeon, admittedly, often obtains a high local reputation; it is not occasionally a spurious one.

What of the surgical specialist's training? In civilian surgery it is generally agreed, and can hardly be argued against, that the sound foundation upon which to build a surgical career is the apprenticeship afforded by the three-year period as a registrar or first assistant in a large, preferably teaching, hospital. The abundant material, the responsibilities, the critical atmosphere in which work is done, the opportunities to see all branches at work, all these contribute to produce a lasting background and perspective. Few can compensate for the lack of this apprenticeship even though they obtain a higher surgical diploma or degree; the limitations of these latter are being increasingly recognized and corrected in the newer regulations. One has been impressed time and again during the war by the difference in outlook between those with the training described and those who have just done an odd house appointment, in a smaller hospital, in addition to the acquisition of the diploma. Very often equally capable in field surgery, of which they have had similar experience, they show marked dissimilarity when confronted at base hospitals with civilian types of disabilities.

Such an apprenticeship as that mentioned must, however, be served early, soon after the holding of a house-appointment or undertaken immediately after qualification. Herein enters the difficulty of the training of Army surgical specialists. The Corps naturally will wish to enlist its officers as young men, to mould them while they are still to be moulded, giving them the general training and experience which will make them good all-round officers, before they are embarked upon any specialism. While some, by prolonged study, study leave, individual zeal, and attendance on large civil hospitals when possible, have surmounted the lack of the early apprenticeship, it cannot be gainsaid that such altogether do not take its place.

Is it possible for future surgical specialists in the Army to have this apprenticeship, or at least a fair proportion of it? The difficulties are obvious. They concern age of entry, rank, seniority, leave of absence, and so on. But a training of the sort seems essential and in a world-age in which standards everywhere are rising it will be demanded.

There are several ways in which this might be done; they can all be criticized. One has said that the young surgeon must be caught early. Would it be possible to pick out in the first three years after entry to the Corps such officers as are likely to become good surgeons, to give them study leave to acquire the higher diploma and to second them for, say, a minimum period of two years in a registrar appointment? There are likely to be many more of such appointments in civil hospitals in the future and, considering the numbers concerned at any one time, it is likely that a liaison between suitable hospitals and the Services could be achieved. The total duration of their absence from the Army would, however, be considerable, probably four or five years in all. Some would fail at the examination fences and require a longer period. The desirable close connexion with the Corps would be lost for a rather longer period than would seem desirable.

Some such scheme would seem necessary should the Corps retain some of those who have proved themselves in war surgery without their having had civilian experience. The two are very different, and peacetime Army surgery is likewise very different from much of war surgery.

An alternative scheme might be to attract into the Army suitable young men, already possessed of higher diplomas and registrar experience, by offering them rank and emoluments and seniority commensurate with their training and qualifications and with some relation to the financial outlay they have already made. I doubt if that idea is as impossible as it may seem at first sight. Many more are pressing after higher qualifications; civil appointments under a National Health Service, with or without private practice, will cause much approximation of individual incomes; service abroad will not, with the development of air transport, prove as great a deterrent as it may have done in the past.

That method, however, is unlikely to commend itself to such as have spent a lifetime in the Corps. They would with some reason point out that the best Army type is more all-round in his ability and that there would be brought into the Corps, did it seek such fully fledged surgeons, a group tending to regard themselves rather apart and even superior. Careful selection might eliminate this danger.

In the *JOURNAL OF THE ROYAL ARMY MEDICAL CORPS*, of March, 1945, "R.E.B."—a thin disguise for one with an active and far-seeing mind—envisaged, at some future date, an "Imperial College of War Medicine for the Armed Forces of the Crown." He urged that the fruitful wartime co-operation of the Services—Navy, Army, R.A.F. and I.M.S.—should not be allowed to lapse and that a collaboration in peacetime could be equally fruitful. "R.E.B." covered much more than surgery in his comprehensive "dream" and included in his plan the establishment of a large hospital in London to which cases from all Services would be admitted, standing in the same relation to the "Imperial College" as a teaching hospital to its medical school. It would, presumably, incorporate all the corresponding "parent" Service hospitals existing before the war. Were this "dream" to be implemented in the fullness of time, it would be possible to have within the Services a wide training in the specialty of Service surgery which could be largely independent of civilian help, which could have its own standard of examinations, although not necessarily frowning upon the acquisition of civilian diplomas, which would have the advantage of preventing too much in the way of separation from the Corps, and which would foster co-operation within the Services. This, of course, would simply be an extension and amplification of the various pre-war Service systems, directed towards greater possibilities. The intending specialist, in the three years' training regarded as essential, would have the scope denied him in the necessarily smaller hospitals already existent in the different Services. His initial surveillance might well be at a larger garrison hospital; at the central Services' hospital it would be incumbent that he should have a measure of responsibility corresponding to registrar status.

Such a central hospital would have a dual function. It would admit enough of the ordinary types of case to allow ample material for the training of proposed surgical specialists; in addition to these, it would be the receiving hospital for the less common cases from all the Services. It is likely that some of the ancillary specialties might well be developed from the latter material. Since the general surgical firms and specialties would have to be headed by an experienced senior it would allow of a greater promotion progress on the clinical side than was previously available.

This idea of a central hospital, however, can be probably only a Utopian dream for some time. The Government, even if agreeable, is unlikely, pressed sorely as it is sure to be for some years both for labour and finance, to embark upon such a scheme for some considerable time. What of the interim? The scheme that commends itself most to one, apart from arranging a civil training for those who stay on in the Army, would be to attract the already-made young surgeon and by careful selection to ensure as far as possible that he will be a good Corps man.

So much for the requirements of peacetime surgery. The teaching of actual war surgery to future Army surgeons will of necessity be mainly didactic. But there will be also the teaching of the many practical points—such as the application of Thomas' splints, the varied uses of plaster of Paris, transfusion procedures and so on. All this follows the line of teaching followed at the R.A.M. College before the war just ended. But the sound instruction so

inculcated did not spread widely enough. In the first years of the recent war the advice of those really acquainted with the subject of war surgery was somewhat lost in a welter of theoretical advice offered by the unacquainted. It did not seem wrong to some to accept the invitation to write upon the war aspects of their civilian subject although their experience of war surgery was nil or slight. The editor of one symposium stated in his preface that war surgery is akin to industrial surgery and excused some of his contributors on that ground. It is a plausible but far from accurate statement. Nothing theoretical can take the place of actual war experience. Taking it even further, it is dangerous to criticize the surgery or surgical strategy of any campaign without a first-hand knowledge of that campaign. Campaigns can differ markedly from one another. They may be static, semi-static, or fast-moving in advance or in retreat; medical units and stores may be scarce or ample. And all these permutations have their effects on treatment. The early confusion was largely due to the fact that amateur writers did not, and could not, visualize field conditions.

Those articles, on the other hand, which emanated from writers with real experience in the last war are sane and refreshing to re-read. No doubt some large volume dealing with the surgery of the recent war will be produced. One would like to see, also, a small volume concerned solely with surgery in the field. If the initial treatment be bad, the end-results will be bad. This suggested work could be on the lines of the present official Field Surgeon's Pocket Book, but made more attractive by the use of larger print and by the addition of illustrations. The value of such a work would be greatly enhanced by an initial chapter descriptive of field conditions. It is all too easy to forget these. After all, evacuation dominates field surgery, and it is difficult for the unacquainted to visualize the delays, the necessities and the mishaps which govern the transfer of the patient and so influence his treatment. It is not enough to state these factors baldly; actual examples must be given, and from all theatres of war.

We live in an age in which reading matter is forever being proffered us. Unless the lessons of these war experiences are put down clearly, succinctly and attractively, there is a danger that the medical journalists of the future will, no doubt with every good intention, again tend to mislead the novice. The novice, alas, has every faith in the written word. The publication and circulation of anything fully authoritative on field surgery was over-delayed in the recent war. It were better, therefore, that there should be officially prepared such a concise work, embodying the principles and practice of field surgery as understood in the year 1945. While Service specialists will have the lecturers, the time and the opportunity to study the subjects thoroughly, there would thus be, in the event of a fresh war, something real and realistic to build upon for the great number of civilians who would again be called upon.

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## SURGICAL NURSING IN WARTIME.

By Sister H. B. ANDERSON.  
*Territorial Army Nursing Service.*

[Received November 16, 1945.]

SURGICAL nursing in wartime presents many difficulties not met with in more normal times. Most of these, however, can be overcome by a little initiative, foresight and adaptability. Always the nurse's chief duty is the welfare of her patient, and even if the ward is a tent or an improvised, not too suitable building there is no excuse for not doing so.

The importance of asepsis is not modified by work in a C.C.S. or mobile field hospital situated only a short distance behind the front line. This can still be achieved by conscientious habits and attention to details. The patient's future largely depends on it.

Routine methods of sterilization are often not possible. Heating facilities may be restricted to one primus stove, used for all purposes. Large sterilizers may be unobtainable; however, if only the latter is lacking a large tin may be used. Failing this, dressing bowls can be flamed and covered until use by a sterile towel. Unfortunately, however, the short supply of methylated spirit prevents the wide use of this method; as an alternative the bowls have to be soaked in an antiseptic solution (i.e. carbolic or lysol 1 : 20) for at least half an hour, then rinsed in sterile water, before use.

Instruments may be boiled in any suitable receptacle or kept in an antiseptic solution.

The sterilization of linen and dressing is usually done by a portable type Autoclas, the pressure being obtained by use of primus stoves. If dressing drums are inadequate large tins with tight fitting lids may be used effectively. Failing this, the dressings may be boiled and applied wet.

Gloves may not be available for wound dressing; however, with the use of two pairs of forceps, the hands need not contact the wound. Masks should be worn always during dressings.

It must be remembered that during a war the patients are admitted in large numbers, often in convoys of several hundred at one time. Before admission to the ward they are divided into severe, moderate and slight. Severe cases are given first attention.

On arrival in the ward it is essential to note the patient's condition. Where there is severe injury, shock and hæmorrhage are the most important. The giving of plasma i.v. infusion by the Bristol apparatus at the time and place of injury aids in reducing the numbers of severely shocked patients admitted to hospital. This method may even be continued throughout the journey if necessary.

If, however, the patient should be admitted in a shocked condition, often due to bleeding commencing on the journey, perhaps by travelling over rough roads, an infusion of plasma should be commenced as soon as possible after arrival. Excessive vomiting may produce a marked degree of shock, and the loss of body fluid must also be replaced. The usual method is continuous i.v. infusion of glucose saline. The blood-pressure should be taken for the accurate measuring of the degree of shock.

Where a tourniquet has been applied prior to admission, its présence is generally denoted by a large "T" written on the forehead. The injured area should be examined and the tourniquet loosened and reapplied if required. The presence of a tourniquet, however, should always be looked for in severely wounded patients, as during a rush period the "T" may have been forgotten. The patient may have applied the tourniquet himself.

Drugs, such as morphia, may also have been given prior to arrival. A large "M" on the forehead may indicate this. Medical documents should be examined and the exact time ascertained to prevent a further injection being given and harm being done to the patient.



Anti-tetanus serum is given to all wounded persons, however slight. Care should be taken to find out if this has been done. A prophylactic dose of anti-gas gangrene serum should be given in all multiple injuries, large flesh wounds and compound fractures.

Penicillin therapy, now so widely used, cannot be effectively carried out without the conscientious co-operation of the nursing staff. It is necessary to keep a concentration of the drug in the body. The usual method of giving is by three-hourly i.m. injections and these should be given without fail at the correct time.

The routine principles of preoperative preparation may not be possible in dealing with large numbers or with severely injured patients. It may only be possible to cut the clothing round the area of the wound; it should then be cleaned and sealed off. In cases where shock or hæmorrhage has been severe, it may be considered necessary to take the patient to the operating theatre without even an attempt being made to remove the clothes.

As routine theatre lists cannot always be adhered to, premedication is not always given in the ward. This can be done in the theatre after the anaesthetist has examined the patient.

The extensive use of P.O.P. in modern surgery protects the area, lessens to a great degree the danger of infection, and ensures more comfort for the patient, particularly if long journeys have to be made. In a case of suspected infection, however, a "window" is cut in the P.O.P. over the wound to enable frequent observation. Great care should be taken after redressing to apply a firm pad and bandage over the window, with sufficient pressure to prevent swelling and discomfort.

Although the use of P.O.P. minimizes the need for routine dressings, it does not detract from the standard of nursing the patient requires. All usual precautions in connexion with P.O.P. should be observed. The use of drugs should only be resorted to, unless otherwise ordered, when more simple methods have failed, e.g. adjusting or elevating a limb, giving an additional pillow and attention to pressure points.

It must be remembered that patients admitted from battle areas suffer from nervous tension or reaction. Much can be done to alleviate this by creating a normal and cheerful atmosphere.

Food also plays an important part in the patient's recovery. Meals should be served hot and in an appetizing manner. If patients have to be evacuated a hot meal must be given within an hour of departure.

## REPATRIATED ALLIED PRISONERS OF WAR AND INTERNEES.

[Received November 16, 1945.]

THE following was written in the form of an appendix to a report by Major-General T. O. Thompson, C.B.E., after his Tour of Inspection following the Japanese surrender.

(1) The route followed and camps seen were roughly as follows :—

To Rangoon, where there were already some 9,000 R.A.P.W.I. flown in from Bangkok, and the camps and hospitals were very congested. Many of the men in hospital were merely there for convenience. To Bangkok, where we saw four camps and a Civil Internment Camp in the town and two Red Cross hospitals staffed by Siamese personnel, also four camps of P. of W. situated 30 to 40 miles from Bangkok. The first, Nakon Pathon, was practically entirely a hospital camp. Bangkok to Singapore where we saw all camps on Singapore Island including Sime Road, the civil internment camp, Changi Gaol, where the bulk of the Australians and Dutch were, Kranji Camp which was merely a hospital camp for Indian troops and all the other camps which had small camp hospitals. Singapore to Sumatra—first to Pakan Baroe, where there were nine different camps spread over a considerable area of rubber plantation jungle, and which included the women's and children's camp at Bankinang quite the worst we have seen although improvements had been made before we actually saw it—then to Palembang in South Sumatra where there were four camps of mixed personnel of all types—back to Singapore to see hospitals, hospital ships and evacuation arrangements—to Java, Batavia, with five camps and several hospitals, and mid-Java, Samarang and Ambarawa. At the latter there were three women's and children's camps which were so overcrowded as to be almost unbelievable that they could have lived under such conditions for two or three years. Then back to Singapore.

(2) *The Spirit of R.A.P.W.I.*—One outstanding feature has been extra high morale of all R.A.P.W.I. although it was less evident amongst internees than amongst prisoners of war. Out of the many thousands of R.A.P.W.I. that I saw, there were not more than about twenty who conformed to the typical textbook picture of "P.W.itis."

This I attribute to three features : (1) to the possession of radio-receiving sets in practically every camp, so that the majority in any camp knew what was happening ; (2) to the amazing work done by medical personnel in every camp ; and (3) to the amazing speed of recovery of all R.A.P.W.I. as soon as food was made available. In some cases food had been available for three or four weeks before the final capitulation, notably in the Bangkok area, and the resulting condition of R.A.P.W.I. was better than those elsewhere who received no extra food until several days after the capitulation. The outstanding feature was the high morale and amazing spirit of R.A.P.W.I.

Here is a story which will illustrate the point :—

At Cycle Camp, Batavia, the Japanese authorities insisted at one time on all Ps. of W. parading and bowing to the sun at the commencement of the parade. So the whole parade solemnly bowed to the sun as instructed and boomed out in loud tones " Good morning Mr. Churchill, Good morning Mr. Roosevelt, Good morning Comrade Stalin ! " The Japanese could not understand the joke !

(3) At all camps it was quite obvious that the Japanese were guilty of the most bestial cruelty. Many of the individual acts passed all comprehension in sheer beastliness. Savage treatment was meted out without rhyme or reason to all and sundry at times and punishments were savage and severe, completely beyond the ends of any real or fancied crime. Deliberate murder was certainly done and deliberate murder by starvation is clearly indicated by the ration scale promulgated on May 26, 1945, which gave a total day's ration of 150

grammes of rice, plus a few meagre extras which were usually never supplied for sick men. The caloric value of such a ration is somewhere around 500 and physically impossible to maintain life.

At the main camp at Palembang; in the middle of the camp in front of the Guard Room, was a small barbed wire enclosure about 10 feet by 8 feet, with a simple lean-to roof, no sanitary arrangements, no shelter and the floor bare mud. Into this, as a punishment, specially selected men were thrown and left there for periods varying from two to three days up to three weeks. On one occasion there were sixteen men in this for five continuous days. They had to take it in turns to sit down, as there was no room for all to sit at once. A number of men went temporarily insane under such treatment. Another cruelty practised by the Japanese was that letters, Red Cross supplies and medicines were withheld, although available in a store just outside the camps. A good part of these were poured into the camps immediately the capitulation was announced.

(4) The outstanding feature of all the camps was the amazing work done by "Medical" everywhere. All types shared this, British, Australian, Dutch, Indian, and it was such that it makes one feel proud to belong to a profession which achieved such a result. The results were wonderful; the value of this work on morale throughout the camps was quite obvious. The effect on the individual medical personnel was also a great help because they were carrying out their own work throughout the period. I give below some examples of what "Medical" have produced in the way of improvisation and overcoming lack of supplies, drugs, dressings, instruments, accommodation and even shelter while suffering perpetually from interference and brutal treatment by Japanese gaolers and medical men.

(5) Losses have been heavy and I doubt if we ever will know exactly the numbers which have been lost by disease or deliberate murder or battle casualties. At one camp on the Burma-Siam Railway the losses from disease alone were stated by one medical officer to be 82 per cent over a period of about four months. Details from Ambon and Sumatra indicate that the losses from disease, usually malaria and dysentery combined, were very heavy indeed. The losses of Sisters, Q.A. and Australian, were in the first place due to deliberate murder on the beach where they were found, and later to cruelty and starvation.

(6) In all camps, owing to the policy adopted by the Japanese, there was a complete, or practically complete, withholding of all normal medical supplies, equipment and facilities. In some cases they did give a certain amount of anæsthetic materials and preventive inoculations for cholera, typhoid and dysentery. There was constant interference with the work of our M.O.s, both by Japanese Guards and Japanese medical personnel. A quota of work would be set, stating that a certain number of prisoners would be available on any given day, and if this quota was not reached the Guards, backed by their medical men, would rout out the sick and unfit without regard to protest by our own M.O.s. If the M.O.s protested too much they were beaten sometimes so badly that fractures resulted, and in several cases senior M.O.s were cast into solitary confinement for three to six weeks.

(7) There were compensations, namely, that Ps. of W. became expert thieves and stole food at the slightest chance. There was always the pleasure of baiting Japanese provided it was not carried so far that brutal reprisal was meted out as a punishment. The Japanese could never understand how or why our fellows were able to sing and whistle and talk and laugh, even under the most adverse conditions and right through brutal punishment. The "Medical" were, of course, in themselves a great compensation to our own people, and hundreds of examples could be given from individual medical officers. One outstanding case was that of Dr. Lyon in the women's and children's camps in Sumatra. She, with the most primitive tools, performed major operations with complete success. The Q.A.s, the Australian Sisters and the I.M.N.S. at Padang were outstanding examples of medical work, magnificently done bringing comfort to the prisoners.

(8) The maintenance of radio sets was an outstanding feature of all camps and in many camps a very short and very secret news sheet was circulated by this means. There were

numerous narrow escapes of discovery and actual discovery of any radio set meant a prolonged and savage death as a punishment. Places of hiding were as follows:—

Hidden behind a bathroom sink, the taps and the whole of which was made to swing out when access to the set was required. A broomhead which was actually in use for sweeping the barrack floor contained a radio set. A concertina which was in constant use and was actually carried on several occasions by Japanese Guards contained a radio set. Numerous water bottles, some made so that water could actually be poured in or out, contained radio sets and were just left lying about for all and sundry to see. A biscuit tin, apparently stuffed with old clothes, had a radio set in it and on one occasion an irate Japanese officer who had rushed in to carry out a search, picked it up and slung it across the room. Fortunately an ex-rugger player who was standing there caught it neatly and prevented it from crashing against the wall. A man with a limp using a large bamboo stick had a radio in the stick. A man with an amputation and an artificial leg had a radio in the leg. Finally, there is the story of how a radio set was transported from one camp to another.

The camp was being broken up and portions distributed to new camps, so the difficulty was to transport this radio set. It was solved by sewing the set up in the kit of the Camp Commandant, who was a complete fiend, and taking it to the camp by this means. When the capitulation took place this Commandant told the prisoners they were free, so the two who were running the radio set paraded before him and asked for a new battery. "What do you want a new battery for?" he asked. "Oh, ours is nearly run dry," replied the two; "And here is the set we have been working." The Camp Commandant was not pleased!

(9) *Medical and Surgical Improvisations.*—These were ingenious and varied in the extreme and were also very efficient for the purpose for which they were devised. They varied, of course, in the several camps with the resources available and the personnel concerned, but it has been interesting to note how ideas and production often followed exactly similar lines in widely separated camps from Java, Sumatra, Singapore, Siam and F.I.C., camps at which there had been no direct contact with any other and certainly no contact by letter.

(i) Transfusion service—a complete set-up with hundreds of donors carried to such an extreme that it became a question in each case whether donors could stand the loss of blood. Much of this was done with sets improvised from stethoscope tubing and hashed-up old needles, etc. This was done in many of the camps, but the most outstanding achievement was a transfusion service with implements made from bamboo—a bamboo connecting the needle to a bamboo delivery tube, a receptacle and funnel made from the two halves of a serum flask, bamboo whisk for defibrinating the blood, bamboo connecting tubing and needle to the recipient. Hundreds of transfusions were done.

(ii) Needles made from bicycle spokes, sharpened, curved and tempered.

(iii) Suction pumps made from two sections of bamboo with metal handle and bucket made from Sam Browne belt.

(iv) Artificial limbs beautifully made, with full range of movement, from old bits of timber, odd scraps of metal and leather from belts, etc. These were seen in several widely separated camps—a radio set was hidden in one.

(v) A microscope magnifying to 250 diameters made from bamboo with sliding action like a telescope—another up to 400 diameters made from two Dutch aluminium mess tins, with screws and ratchets from odd bits of brass, with a condenser and with the most beautiful diaphragm made of old razor blades.

(vi) A dentist's drill, which did much good work, made from a cheap Japanese grindstone with its small handle, a length of Bowden cable from an old motor bicycle attached to the spindle, a slide valve made from a car tappet and guide and then the right-angled hand-piece and drill. This contraption was fastened to the arm of the dental chair (home made) and, while an attendant madly turned the handle, the dental surgeon did his drilling. Many hundreds of stoppages were done.

(vii) A soap factory using dregs of oil cake from squeezed copra (coconut). The difficulty was the alkali as there were no apparent stocks, so large quantities of urine were collected

in the camp and caustic alkali manufactured from this. The soap was of an excellent quality.

(viii) In one camp an X-ray plant was available, but only for fluoroscopy. Only two kilos of barium salt were available, so barium meals were used for many months by collecting the evacuated barium meal stool and recovering the barium for re-use time after time.

(ix) Dental powders and creams were made.

(x) Spectacle glasses were ground on a specially devised turntable to exact prescriptions, even cylinders for astigmatics, but this grinding was all limited to plano-convex type. This same factory made one good telescope.

(xi) Spectacle frames were made at several camps, accurately beaten out of aluminium in one camp. At Sime Road, Singapore, was a most ingenious workshop. Here they were made from old toothbrush handles—the results with chosen colours were not only absolutely accurate in fit but beautiful and practically indistinguishable from the factory-made article.

The toothbrush handle had the existing hole cut away. Then the straight piece was placed in a specially devised and home-made self-centring chuck and vice which could be operated inside a specially made steam chamber with a window to watch operations.

A sliding knife, centred by the chuck, then grooved and finally split the handle, leaving a predetermined portion uncut at one end. Softened by steam the two halves were then pulled apart, the connecting portion taking a natural curve which eventually formed the bridge; a pair to this was then formed with the bridge curve in the reverse way. The two parts, upper and lower, were then moulded into the shape to take the lenses by insertion of the wooden bougies of expanding size. The exact inter-pupillary distance was measured off on a vernier scale on the chuck, the whole being done under steam to soften the parts. Finally the two halves were fastened together with the lenses into position.

The maker of this was a botanist.

(xii) In several camps spirit and 98 per cent alcohol were obtained by distillation from rice or other sources. Special cocktails were also devised. Emetine was extracted from some old stocks of ipecac.; vitamin products manufactured as green sludge, etc., from grass, tapioca leaves, etc.

One chemist has secured a disinfectant or bacteriostat which may rival the best-known ones, possibly even penicillin.

(xiii) A whole series of colostomy operations was done as a treatment, and proved to be cure, of chronic amœbic dysentery which was steadily killing the individuals. Then a receptacle was devised for each from a Dutch aluminium water bottle with the neck sealed off and a lateral opening made to fit over the colostomy wound. The receptacle was then fastened into position permanently by a special set of braces and belt made from old chin straps from steel helmets; the rubber straps gave excellent security. Men returned to full heavy work and the dysentery cleared up.

(xiv) Rehabilitation implements, sewing machines, treadles, crutches, ladders, extension apparatus were all made and used.

(10) Many other things were made wherever possible. Band instruments were a special feature and complete orchestras with music remembered or even specially orchestrated were made in several camps and used for periodic concerts—when the Japanese were not too B-minded. Fishing tackle was made and used with success; some extremely curious forms of hook, line and reel were used. Flags: A noticeable feature were the flags which were produced. Quite a number of men had Union Jacks hidden away somewhere or a flag of some sort.

(11) The chief diseases and symptoms are fully described in several excellent reports. The most obvious conditions were: Starvation—of which I have already mentioned the cause, namely, a ration scale which cannot support life. Tropical ulcers—few men, and women for that matter, have escaped without marks. Beriberi—with the swollen lower limbs and the central scotoma and general inability to read.

(12) This view of thousands of prisoners and internees, which I have had the luck to have seen, brings out one or two points worth mentioning.

(a) That the races of the Commonwealth of Nations in spite of adversity still have the "guts" and fortitude which spread them over the world. There must have been thousands of acts of pure heroism which will never be known. Many Indian troops showed the same characters, often through bitter brutality and tortures.

(b) That at every camp two, three or perhaps a dozen automatically came to the top irrespective of rank or seniority, took charge, initiated service or improvements and in fact became the leaders.

(c) All Japanese were not cruel, particularly those with real western contacts and education. Quite a number are recorded as having helped to the limits of their resources.

(d) Discipline had a most marked effect on morale and on well being, in spite of starvation, and on ability to pull through. The lack of this was noticeable in the Civil Internees camps.

(e) To disciplined men the daily shave and wash were great assets; to the women the possession of a treasured lipstick and cake of soap.

(13) The rate of recovery was remarkable. As soon as food became available an average of 12 to 14 lb. in the first week was the gain in weight. There was little evidence that those who had been on a prolonged rice diet could not readily change over to normal diet. One Dutchman we saw had put on 35 lb. in twenty days. The average loss of weight I think must have been about 2 or 3 stones.

(14) Finally, I would like to emphasize that Mastiff and R.A.P.W.I. Control, the organizations which have been dealing with this whole scheme, have done a grand job. It was a rush job owing to the sudden Japanese capitulation and it was spread over vast distances—Ceylon to Singapore is a 5 or 6 days' sea journey; Sumatra itself is 1,400 miles long.

An organization which could at a couple of weeks' notice arrange to contact, collect, clothe, house and transport on the way home 100,000 Allied Prisoners of War and Internees within one month, and was able to continue to do so at 1,000 to 2,000 per day for the remaining 100,000 over these distances, has little to fear from criticism. "Medical" and Red Cross have had a full share in this and can be proud of it.

[The Commandant of the Royal Army Medical College would be glad to receive specimens of Improvements for inclusion in the College Museum.—Ed.]

# DIETARY DEFICIENCY DISEASES AMONG PRISONERS OF WAR.

By Captain M. H. CHURCHILL, M.R.C.S., L.R.C.P., F.R.G.S.  
*Royal Army Medical Corps.*

[Received November 16, 1945.]

THIS paper is based on the notes of nearly five hundred cases of deficiency disease occurring amongst prisoners of war in Singapore and Thailand during 1942 to 1945. They are grouped under three headings :—

- (a) Ophthalmic deficiency diseases.
- (b) Diseases due to deficiency of riboflavin and nicotinic acid (formerly called B<sub>2</sub> complex).
- (c) Beriberi (with notes on tachycardia and cedema as isolated physical signs).

## ÆTIOLOGY.

(1) DIET.—The ration scale in two typical camps (for men doing hard physical work) was as follows :—

						May, 1942	December, 1942
						Ounces per man per day	
Rice (polished) ..	..	..	..	..	..	20·0	24·7
Sugar ..	..	..	..	..	..	0·6	0·7
Salt ..	..	..	..	..	..	0·25	Nil
Oil ..	..	..	..	..	..	0·15	0·09
Tea ..	..	..	..	..	..	0·2	0·08
Vegetables ..	..	..	..	..	..	3·0	16·2
Pork or dried fish ..	..	..	..	..	..	0·76	1·0
Wheat flour ..	..	..	..	..	..	1·6	Nil

The value of this ration scale may be judged from the following figures taken from " *Field Service Hygiene Notes, India* " :—

*Rice (Polished).*—One ounce gives 110 calories but, owing to the removal of the husk and pericarp, it is deficient in all vitamins. The rice supplied to the prisoners of war was stored in makeshift go-downs, always hot and often damp, for long periods before use.

*Sugar.*—One ounce gives 100 calories but it is deficient in all vitamins.

*Oil.*—One ounce gives 257 calories. Vitamins A, B<sub>1</sub>, and the B<sub>2</sub> complex are present.

*Vegetables.*—The rations included Chinese radish, pumpkin, sweet potatoes and dried cabbage. Of these, pumpkins contain vitamin A and sweet potatoes B<sub>1</sub>.

*Pork and Dried Fish.*—The amounts supplied gave negligible quantities of calories. Pork, however, contains vitamin B<sub>1</sub> and the B<sub>1</sub> complex.

*Wheat Flour.*—Ceased to be a ration after the middle of 1942.

It will be seen that these diets, which were quite representative, were about 25 per cent deficient in caloric value for men doing hard work such as clearing jungle, building railway embankments and blasting cuttings through rock. The vitamin A was almost sufficient. The vitamin B<sub>1</sub> (thiamine or aneurin) was deficient. The vitamin B<sub>2</sub> complex (especially riboflavin and nicotinic acid) was also deficient. It should be mentioned that the prisoners were sometimes able to supplement their rations by buying eggs, peanuts and gula malacca, but the supplies were short and irregular. No additional or special rations were allowed by the Japanese for sick men.

It appeared that the supply of vitamin C was adequate for scurvy did not appear amongst these prisoners of war.

(2) DISEASE.—The frequent relapses of malaria to which the men were subject caused a progressive anorexia. The exhaustion due to overwork had a similar effect. Chronic diarrhoea (perhaps pellagrous in origin) and both forms of dysentery (bacillary and amœbic) entailed a persistent failure of absorption. These complaints were common amongst the prisoners of war.

## OPHTHALMIC DEFICIENCY DISEASES.

(1) AVITAMINOSIS AMBLYOPIA (NEURO-RETINITIS).—This was a common condition, the first cases appearing within four months of the prisoners going on to the Japanese ration scale. In August, 1945, in one camp in Thailand, eighty-one men out of twelve hundred were affected; but a considerable number of men suffering from this condition had already died from other diseases. Of these eighty-one cases, ten followed shortly on an attack of dysentery; in sixteen there was an association with beriberi; in four with stomatitis; in three with "happy feet" (a deficiency disease to be described later) and in two with pellagra. The outstanding symptom was a blurring of vision, but this was preceded by a smarting in the eyes, lachrymation and photophobia. When working in the sunlight many of the patients experienced actual pain behind the eyes. The blurring was usually first noticed on reading, but soon some of the men were unable to recognize people or objects out-of-doors. The failure of sight was often progressive and severe; in other cases it progressed to a certain stage and then remained stationary; in others again it varied, improving when there was any substantial improvement in the diet. These men had subjective scotomata but rough tests could show no impairment of the visual fields and no perimeter was available.

The ophthalmoscope showed a retina which was often redder than normal with swollen veins. The disc was pink and its margins were frequently blurred; occasionally the temporal half of the disc was quite white. Of seventy-seven cases (examined with Major J. Dragten of the Dutch Army Medical Service) some degree of cupping or excavation of the disc was present in thirty-six cases, and the lamina cribrosa was seen in eight. A puzzling feature of this disease was the apparent lack of correlation between the visual defect and the extent of the ophthalmoscopic changes.

*Examples.*

*Case 1.*—Pte. C. One year ago sight became blurred. Recovered on taking rice-polishings and pea-soup (the Malay Kachang idjoe). Three weeks ago the blurring returned, with frontal headache, especially in sunlight and the eyes began to water. V.R. 6/9. V.L. 6/9. Ophthalmoscopy: Retina deep red and streaked, veins swollen. Disc slightly congested, cupping deep and lamina cribrosa visible, fovea normal.

*Case 2.*—Signalman D. Rapid failure of sight; two and a half years ago, eyes first felt tired on reading, then the sight became blurred for near work, finally he was unable to see clearly at any distance. There was a temporary improvement with extra food (bought from camp funds). Now complains of blurred sight, smarting (especially in bright sunlight) and "heaviness" of the eyes. R.V. 6/36. L.V. 6/36. Ophthalmoscopy: Retina deep red and streaked, veins slightly swollen. Disc congested and margins blurred, fovea normal.

Many cases of this complaint improved if they could be given extra food, especially eggs and liver. Others improved if they could be kept away from the tropical sunlight. There seemed to be two causative factors (as in the skin lesions of pellagra), namely, the dietary deficiency and the solar radiation. The sunlight caused trouble only if the diet was defective; and men on defective diet only developed symptoms if they were exposed to bright sunlight.

(2) NIGHT-BLINDNESS.—This was a rare condition among the prisoners of war, occurring in only three out of twelve hundred men. It was associated with only one of the eighty-one cases of avitaminosis amblyopia. This comparative rarity was probably due to the fact that pumpkins, rich in carotene, were a fairly constant item in the ration scale.

(3) CORNEAL ULCERATION.—This was not more common amongst the prisoners of war in Thailand than amongst ordinary British troops in the tropics. Only four out of the same twelve hundred suffered from corneal ulcers.

## RIBOFLAVIN AND NICOTINIC ACID DEFICIENCY DISEASES.

The conditions generally allowed to be due to the deficiency of the B<sub>2</sub> complex are certain skin lesions and gastro-intestinal symptoms ("true pellagra"), stomatitis and scrotal dermatitis ("ariboflavinosis"), cheilosis and probably the condition known amongst the prisoners of war as "happy feet" (nicotinic acid deficiency).



## SKIN LESIONS.

(1) *Pellagrous Pigmentation*.—In the early stages the patients complained of sunburn. The parts affected were the parts most exposed to the sun, for example the shoulders, the fore-arms and, in men working without boots, the dorsum of the feet. There was a red diffuse blush which was sometimes tender; occasionally the red area was oedematous and blistered. At this stage pressure with a microscope slide would completely blanch the part. Men with fair skins were more often affected than dark-skinned men. At a later stage the discoloration became dusky, and pressure with a slide failed to blanch the skin because a brown granular pigmentation had been laid down. The pigmentation was darkest in men who normally pigmented well on exposure to sun-light. The condition regressed on giving rice-polishings and protecting the skin from the sun. It was often recurrent. It was sometimes associated with desquamation of the lips and sore tongue, but it often occurred alone.

(2) *Cornification of the Knuckles*.—A thickening of the skin over the metacarpo-phalangeal joints of the hands was both an early and persistent sign of pellagra; it is, indeed, the lesion from which the name of the disease is derived (the name is Italian, meaning "rough skin"). A similar appearance was seen on the elbows and over the interphalangeal joints of the hallux.

## GASTRO-INTESTINAL SYMPTOMS.

These were mainly loss of appetite and persistent diarrhoea, sometimes associated with stomatitis. The diarrhoea lasted for weeks or months and the patients became greatly emaciated. The frequent stools were watery and did not contain blood; there was little or no pain, but there was a feeling of great weakness, intensified on defæcation. In many cases progressive emaciation led to death. Post-mortem examination in two cases showed a general atrophy of the bowel which was as thin as parchment.

*Stomatitis*.—The tongue became desquamated and raw and sometimes swollen; the filiform papillæ stood out as a red stippling, especially at the margins. At a later stage the surface sometimes became smooth and pink, but it was often fissured, the fissures being multiple but not very deep. The tongue was unduly sensitive so that the patient could not eat hot or spiced foods and tobacco caused pain. Salivation was excessive. The condition was cured by rice-polishings and peanuts.

Occasionally a man complained of sore throat and was found to have hyperæmia of the oropharynx and an arc of hyperæmia extending above the uvula from one tonsillar fossa to the other. This arc, or bow, was quite characteristic; it disappeared on taking rice-polishings or peanuts.

The following case is illustrative:—

Gnr. D., aged 30. Complains of sore tongue for the last three days. Has had chronic diarrhoea for four months. Is thin and has pellagrous pigmentation on the anterior axillary folds. Angles of the mouth are fissured. The tongue swollen, smooth and fissured centrally; at the margins the papillæ are prominent. Salivation is excessive.

*Scrotal Dermatitis*.—This condition occurred commonly during the earlier months of captivity but grew rare as the prisoners' clothing became more scanty, allowing a freer evaporation of sweat. It occurred in men who were doing hard physical work and sweating freely. The first stage was a brawny desquamation associated with itching. The scrotal skin became red and oedematous. Further desquamation and excoriation left a smooth, pink, weeping surface on which crusts were formed by the drying discharges. Part or the whole of the scrotum was affected. With a widespread excoriation the condition was very painful, the patient walking with his legs wide apart to prevent chafing. The inguinal glands were rarely enlarged or tender. Stomatitis, as already described, was so frequently associated as to be almost part of the disease; only eighteen in a series of a hundred and seventy-four cases of scrotal dermatitis escaping without stomatitis. In seven cases infection by the Klebs-Loeffler bacillus was a complication; it was associated with a peculiar foetid smell but not necessarily with a slough. In one case a spreading septic ulceration involved the thighs and the anterior abdominal wall widely and the patient died. The other cases recovered.

The local dressing was unimportant—normal saline on gauze was the best. They all recovered on Marmite when this was available, otherwise rice-polishings were effective.

*Cheilosis*.—This was an epithelial desquamation affecting the lower lip and the angles of the mouth. On the mucous surface little milky fissures were seen running back from the angles. At the same time there was desquamation in the naso-labial folds. This was a common condition, occurring either alone or associated with some other deficiency disease, especially pellagrous pigmentation and stomatitis.

*"Happy Feet"*.—A common condition, known to the troops as "happy feet" or "aching feet," was characterized by intractable tingling, aching or shooting pains, mainly in the feet but occasionally also in the fingers. The ætiology was the same as in the other deficiency diseases, namely, defective diet, frequent malaria with anorexia, or chronic diarrhœa or dysentery with failure of absorption. It was sometimes associated with stomatitis and scrotal dermatitis. It was intermittent in the early stages but it became very persistent. The pain could be forgotten when the patients were at work; it always became worse at night and, in bad cases, led to serious insomnia. In many camps it was usual to see these men wandering unhappily between the huts or tents at any time of the night. In a series of twenty-seven cases the symptoms had been present for periods varying between one month and two years. In eight cases there was associated weakness of the limbs. In seven of the worst the knee-jerks were brisk. In six there had been conspicuous loss of weight, up to 3 stones. In the majority of cases, however, the general health was good and there was no complaint except of the aching feet. In eleven cases Marmite and nicotinic acid were given by mouth without improvement, but subcutaneous injections of nicotinic acid gave immediate results in seven cases. In milder cases rice-polishings seemed to be effective.

#### BERIBERI.

The essential lesion of beriberi is a "peripheral neuritis"; cardiac symptoms and an associated œdema may or may not be present.

The first group to be discussed comprised eighty cases, most of whom were seen within two or three days of onset and none later than three weeks. The first symptom in fifty-four of these cases was swelling, particularly around the malleoli and on the dorsum of the feet. The first symptom in thirteen cases was weakness, and in another thirteen it was paræsthesiæ, described variously as pain, cramp, numbness, aching or pins and needles. The lower limbs were affected in all, the upper limbs in only three cases. The physical signs in the same eighty cases were: weakness (58), especially in the quadriceps, but foot-drop with its characteristic gait was present in two cases only. In fifty-eight cases also there was sensory impairment, e.g. to pin-prick or hair plucking, or abnormal tenderness of the calves. In one case the sensory branches of the fifth cranial nerve were involved. Tendon reflexes were abnormally brisk in twelve cases and were absent in thirty. By the end of three weeks the tendon reflexes were lost in all cases in this group, the ankle-jerks usually before the knee-jerks. Œdema was present in sixty-eight, affecting the feet, ankles, legs, penis, scrotum, hands and face; hydrarthrosis of the knee was not uncommon. The distinction between a "wet" and a "dry" beriberi is, however, unnecessary; the essential lesion is the peripheral neuritis. There was tachycardia in twenty-four cases and some of the men complained of breathlessness on exertion; their hearts were not found to be enlarged. Gastro-intestinal troubles were not conspicuous. A systolic bruit, audible in the antecubital fossa, which has been described as a cardinal sign of beriberi, was not often found and was not constant in any individual.

The later course of beriberi was seen in a second group, comprising one hundred and five cases, who came under observation one to three months after the onset. In all these cases muscular weakness was demonstrable; in eight cases the upper limbs were affected as well as the lower. Sensory loss was found in ninety-eight cases, the cutaneous area most frequently involved being the inner side of the leg for about six inches above the internal malleolus. The cranial nerves were affected in seven cases either by anæsthesia in the fifth

nerve area or by loss of taste in the front of the tongue. One patient showed cutaneous anæsthesia over the chest and the upper part of the belly, changing to hyperæsthesia over the lower abdominal wall. The tendon reflexes were increased in ten cases and lost in sixty-two. There was œdema in sixty-eight, but here, again, the distinction between "wet" and "dry" beriberi is artificial; many cases are "wet" at one stage and "dry" at another. Tachycardia was present in seventeen but it was difficult, clinically, to be certain of enlargement of the heart. The dramatic and distressing condition of acute cardiac beriberi with congestive cyanosis, dyspnoea and œdema of the lungs was seen only twice.

*Tachycardia as a Physical Sign.*—In at least two camps patients were diagnosed as suffering from tachycardia, supposedly due to latent beriberi. In a series of seventy-four of these cases, only eight gave a history of beriberi and none had signs of a peripheral neuritis. They were treated by rest and diet, but without much improvement; after this when they had to march ten kilometres on a hot day, carrying their kit, only two were unable to finish. Analysis of these cases showed four groups: (1) Tachycardia, diagnosed on routine examination, usually following repeated attacks of malaria, and without other symptoms, thirty-seven cases. Here the tachycardia was probably the result of the antecedent malaria. (2) Cases diagnosed on routine and developing symptoms after the diagnosis was made, sixteen. These showed most of the characteristics of cardiac neurosis. For example, Pte. M., aged 26, complained of pain in front of the heart and breathlessness. Eighteen months previously tachycardia had been diagnosed on routine examination following malaria. He then began to have sharp stabbing pain below the left nipple and breathlessness on exertion and also while resting; his feet never swelled. On examination his general condition was good; his pulse-rate 92 at rest, rising to 100 after slight exertion and returning to 92 after one minute. He had no other physical signs. He began to work again without ill-effect. (3) Symptoms arising spontaneously with tachycardia and probably attributable to cardiac neurosis, thirteen cases. For example, Gnr. R. complained of pain below the left nipple, breathlessness and throbbing of the heart. His pulse-rate was 120–140–120. There were no other physical signs. He continued to work and gradually lost his symptoms. (4) In eight cases the tachycardia dated from actual beriberi and appeared to be a residual symptom. For example, Gnr. H., aged 25, complained of palpitations and breathlessness, starting with beriberi two years previously. The symptoms were now present only on exertion and there was no œdema. Pulse-rate 104–124–96. Knee-jerks were normal.

*Edema occurring as an isolated sign*, without peripheral neuritis and independent of cardiac or renal disease, ten cases. This condition has been called "famine œdema." It is characteristic that the pulse is slow. For example, Pte. B., aged 27, complained of swelling of the legs for three days; his face became puffy two days ago. He had no other symptoms. On examination his face was full, pitting on pressure over the malar bones. Pulse-rate 64, heart n.a.d. There was œdema of the feet and legs and effusion into the knee-joints. There were no signs of peripheral neuritis and the urine was normal.

In any case of beriberi with œdema it is possible that the œdema is a "famine œdema" coinciding with a peripheral neuritis and due to the same defective diet. If this is so, œdema is not an essential part of beriberi except where it occurs as a sign of heart failure.

#### SUMMARY.

A number of deficiency diseases are described, including an ophthalmic condition which is, perhaps, not well known. The elements of the pellagra symptom-complex were found to occur separately. A number of cases of beriberi are analysed.

#### REFERENCES.

- . LEONG, P. C. Nicotinic Acid Content of Foods, *Jnl. Malayan Branch B.M.A.*, December, 1940.  
*Idem.* Riboflavin Content of Food, *Jnl. Malayan Branch B.M.A.*, December, 1940.

## *Editorial.*

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WE wish to express our appreciation and thanks to the contributors who have given up so much of their time to make this Special Number possible.

It is not intended to attempt the impossible and embark upon a detailed review of War Surgery but, rather, to place on record some of the advances made during the war. It is also intended as a tribute to the many surgeons who have done such excellent work in the diverse theatres of this far-flung war. This is our excuse for embarking on the perilous adventure of a Special Number.

We are particularly glad to see references to the outstanding work done by the Army Nurses. It is, as has been said, not difficult to carry out efficient nursing under "Ritz-Carlton" conditions but never, even under the most trying and adverse circumstances, has the standard of nursing ever deteriorated. This applies to the nursing orderlies of the Corps equally with the "Q.A.s". In the Western Desert, the Burma Jungles and everywhere else there were times and circumstances when the "Q.A.s" could not be used and here the nursing orderlies carried out their tasks with efficiency, never-failing courage and cheerfulness.

Some may consider that we have given surgery the centre of the stage with all the lime-light. That may be, but this number deals with only one act of the Drama of War. Battles are the most dramatic incidents of war and the tendency is to judge the success or failure of an Army's Medical Services by the surgical treatment of battle casualties.

The surgeons—and they are the first to admit it—owe much to the hygienists, to the physicians and to the psychiatrists whose, shall we say, "off-stage" labours produced actors physically and mentally fit for the final Drama of Battle. Without this physically and mentally fit material to work on the surgical results in this war could not have been so satisfactory—not even with penicillin, the sulpha drugs and, that inestimable boon, transfusion.

We may here pay tribute to the People of Britain who responded so generously and wholeheartedly to the call for blood. The Army owes them a great debt of gratitude. Never before have the people of a country been able to give so much, so generously and so directly, to the wounded.

No little credit is due to the anæsthetists who shared all the inconveniences and discomforts of front line surgery as an integral part of the surgical teams. There have been many reports of the excellent anæsthetics given by orderlies in advanced surgical units as well as by Sisters when occasion arose. It is interesting to note the frequency with which intravenous anæsthesia was used with its avoidance of post-operative nausea and vomiting.

Again, how much do we owe to modern methods of transport? The advantages of air transport have possibly been over-estimated, inasmuch as many overlook the fact that the wounded have to be conveyed to and from the planes. Air transport cannot entirely replace other forms of transport, and stretcher bearers, ambulance cars and other methods will always be needed. Under certain circumstances air transport is invaluable but only when the circumstances are suitable. Future development of the helicopter type will enhance its usefulness but planes of any type remain vulnerable vehicles in war. Not until we have air ambulances designed, built and operated as such will this form of transport of wounded and sick be entirely satisfactory. Sealed cabins are necessary to overcome the unpleasant effects of high altitude flying.

The future of surgery in the Army has, like many other topics, become an interesting problem. With the advent of a State Medical Service it may well be that the future will see a much closer integration between the Civil Medical Service and the Medical Services of the fighting forces. This is, however, inextricably bound up with politics and with politics we

are not concerned. Far be it from us to lay down any line of policy but we have been glad to receive articles which embody constructive ideas.

One outstanding feature of the war has been the free interchange of experiences and ideas between surgeons of the Allied and Dominions Forces. It is assuredly certain that many of the close and intimate personal contacts then made will be of lasting benefit to our respective countries in years to come.

We seem even to have learned something from our enemies, if only that we were well ahead of them in everything !

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### Notices.

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#### "THE CORPS NEWS AND GAZETTE."

DURING the period of the war it has been impossible, on account of reduction in the supply of paper, to publish separately THE CORPS NEWS AND GAZETTE.

As soon as the easing of the paper control makes it possible, THE CORPS NEWS AND GAZETTE will be re-commenced as a separate publication in the form and at the subscription rate in force before the war.

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#### "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

##### BACK NUMBERS.

THE Manager is constantly being asked for back numbers of the Journal, particularly for the war period. Owing to limitations imposed by the paper control the few spare copies are almost exhausted. It will be greatly appreciated if any officers who are willing to dispose of back numbers would send them to the Manager, A.M.D.2, War Office, London, S.W.1. Cost of postage will be refunded on request.

Copies of Journals of the following dates are particularly needed :—

- October, 1939, to end of 1941.
- 1942. March and June to December.
- 1943. January and March to July.
- 1944. January and March.
- 1945. January to April.

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#### ROYAL VICTORIA HOSPITAL, BELFAST.

##### HOSPITAL SUPERINTENDENT.

THE Board of Management of the Royal Victoria Hospital, Belfast, requires the services of a Medical Superintendent or House Governor.

The Royal Victoria Hospital is a voluntary hospital and the principal teaching hospital of the Belfast Medical School which is one of the largest in the United Kingdom.

There are 554 beds in the general wards, a private patients' hospital of 92 beds, and a maternity hospital of 96 beds, together with a large extern department and a small convalescent home. Large extensions of the hospital are contemplated in the immediate future.

Previous experience of hospital administration is essential.

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Applicants, including those at present serving with H.M. Forces, should forward full particulars with copies of recent testimonials to the Honorary Secretary, Royal Victoria Hospital, Belfast.

This post is now re-advertised so that candidates from the Armed Forces may have an opportunity of applying, now that hostilities have ceased.

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**THE ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.**

**ELECTION OF PRESIDENT.**

Colonel Walter Elliot, *P.C.*, *M.C.*, *F.R.S.*, *F.R.C.P.*, has been elected President of The Royal Institute of Public Health and Hygiene in succession to the late Sir Stanley Woodwark.

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**MEDICAL OFFICER AT THE TOWER OF LONDON.**

It is proposed to revert to the appointment of an officer, *R.A.M.C.* or late *R.A.M.C.* (retired pay), as Medical Officer at the Tower of London.

Applications from officers who wish to be considered may be submitted to the Under-Secretary of State for War (*A.M.D.I.*), The War Office.

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**R.A.M.C. OFFICERS' WIDOWS' AND ORPHANS' FRIENDLY SOCIETY.**

The Society will reopen on January 1st, 1946, and applications for membership will be received from Regular Officers of the *R.A.M.C.* from that date. Secretary, 85, Eccleston Square, London, S.W.1

## EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps and articles of a non-scientific character may be accepted for publication under a nom-de-plume.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twelve reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twelve excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W.1."

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The fact that goods made of raw materials in short supply owing to war conditions are advertised in the Journal should not be taken as an indication that they are necessarily available for export.

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## THE VICTORIA CROSS.



### CITATION.

The KING has been graciously pleased to approve the posthumous award of the *Victoria Cross* to :—  
No. 11006144 Lance-Corporal Henry Eric Harden, Royal Army Medical Corps (Northfleet, Kent).

In North-West Europe on January 23, 1945, the leading section of a Royal Marine Commando Troop was pinned to the ground by intense enemy machine gun fire from well-concealed positions. As it was impossible to engage the enemy from the open owing to lack of cover, the section was ordered to make for some near-by houses. This move was accomplished, but one officer and three other rank casualties were left lying in the open.

The whole Troop position was under continuous heavy and accurate shell and mortar fire. Lance-Corporal Harden, the R.A.M.C. orderly attached to the Troop, at once went forward, a distance of 120 yards, into the open under a hail of enemy machine gun and rifle fire directed from four positions, all within 300 yards, and with the greatest coolness and bravery remained in the open while he attended to the four casualties. After dressing the wounds of three of them, he carried one of them back to cover. Lance-Corporal Harden was then ordered not to go forward again and an attempt was made to bring in the other casualties with the aid of tanks, but this proved unsuccessful owing to the heavy and accurate fire of enemy anti-tank guns. A further attempt was then made to recover the casualties under a smoke screen, but this only increased the enemy fire in the vicinity of the casualties.

Lance-Corporal Harden then insisted on going forward again with a volunteer stretcher party, and succeeded in bringing back another badly wounded man.

Lance-Corporal Harden went out a third time, again with a stretcher party, and after starting on the return journey with the wounded officer, under very heavy enemy small arms and mortar fire, he was killed.

Throughout this long period Lance-Corporal Harden displayed superb devotion to duty and personal courage of the very highest order, and there is no doubt that it had a most steadying effect upon the other troops in the area at a most critical time. His action was directly responsible for saving the lives of the wounded brought in. His complete contempt for all personal danger, and the magnificent example he set of cool courage and determination to continue with his work, whatever the odds, was an inspiration to his comrades, and will never be forgotten by those who saw it.

In the Parliamentary Debate on March 14, 1945, Sir James Grigg, His Majesty's Secretary of State for War, said: "I do not remember ever reading anything more heroic."



## LORD DAWSON.

"Honour a Physician with the honour due unto him for the uses which you may have of him."

LORD DAWSON's services to medicine are well known and have been fully dealt with in many notices that have appeared about his distinguished career. In these, his services to the Army have been briefly outlined. They deserve a fuller account and a wider publicity within the Army Medical Services.

In the war of 1914 to 1918, Lord Dawson, after a brief period with the 2nd London General Hospital, became Consulting Physician to the Army in France early in 1915 and continued as such until May, 1919. Originally a colonel, he was promoted to the rank of Surgeon-General, later Major-General, and his services were recognized officially by three Mentions in Despatches and the awards of C.B. and Legion of Honour. During this period his guidance in medical cases and in the wider aspects of medicine was of the greatest value to the Army, and his talks at medical meetings in hospital areas were characterized by a shrewd understanding and wide knowledge and experience which made them so valuable.

Between the wars Lord Dawson maintained an active interest in the Army Medical Services. He was a member of the Army Medical Advisory Board from 1919, and from 1936 chairman of that body. In this capacity he was very frequently consulted by successive Directors-General on matters of Service medical policy and always willingly gave much time and consideration to the various problems presented to him.

He had a great facility for weighing up the various conflicting views of a subject and providing a solution wise, acceptable and practical, and for this we shall miss his presence in our counsels. And so there has passed a memorable figure from among us; he shall be greatly missed.

"The skill of the physician shall lift up his head: and in the sight of great men he shall be in admiration."

ALEX HOOD,

*Director-General, Army Medical Services.*

THE WAR OFFICE,  
March 15, 1945.



## HARDEN V.C. MEMORIAL FUND.

HER MAJESTY THE QUEEN, Colonel-in-Chief of the Royal Army Medical Corps, has graciously given a donation to this Fund which we gratefully acknowledge.

The total amount received up to July 7 is £8,327.

Included in this are donations from members of other branches of the Service sent as a token of admiration for Lance-Corporal Harden's outstanding heroism.

To administer the Fund the following Trustees have been appointed :—

The Director-General, Army Medical Services ;  
The Deputy-Director of Medical Services, Eastern Command ;  
The Commandant of the Royal Army Medical College ; and  
Messrs. Holt & Company.

The Honorary Secretary is the Secretary of the R.A.M.C. Fund. This Officer's address is 85, Eccleston Square, London, S.W.1, and by him further donations will be gratefully received.

There could be no better memorial to Lance-Corporal Harden than that the education and future of his children should be assured.

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### WAR OFFICE

May 11, 1945.

#### TO ALL RANKS OF THE ARMY MEDICAL SERVICES.

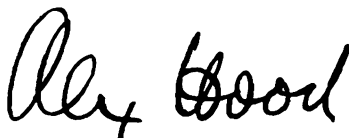
At this time when our hearts are full of thankfulness and our chief enemy is completely defeated I would like to thank all members of the Medical Services at home and abroad for the way in which they have carried out their part in achieving this victory.

Some of our friends and comrades have fallen in the long and arduous journey we have made since September, 1939, and they will live in our hearts and in the history of our Service always.

Some have been set free from prison camps and we welcome them back joyfully ; I would say a special word to you for all you have done for your fellow captives during these bitter years ; nothing could have exceeded your devotion to duty in face of hardship and difficulty. When the tale is fully told it will be clear that out of affliction came strength, courage and glory.

To all of you, wherever you are serving and in whatever capacity, yours has been a great and noble part in this glorious victory for, by your efforts, disease, pain, and death have been defeated as never before in the history of wars. We can look back with satisfaction but in no spirit of complacency ; we can look forward with hope. But there is more to do, one more cruel enemy remains and until he is beaten to his knees we cannot relax our efforts and so, with confidence in your ability and will to continue the great work, I thank you.

God be with you all.



*Director-General, Army Medical Services.*





# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS

### Corps News.

JANUARY, 1945.

#### EXTRACTS FROM THE "LONDON GAZETTE."

##### NEW YEAR'S HONOURS.

*January 1, 1945.*—The KING has been graciously pleased to signify His Majesty's intention of conferring the Honour of Knighthood upon the following:—

Lionel Ernest Howard Whitby, Esq., C.V.O., M.C., M.D., B.Ch., F.R.C.P., M.R.C.S., D.P.H. (Brigadier, Territorial Army, Reserve of Officers), lately Bacteriologist at the Middlesex Hospital. For services in the development of the sulphonamide group of drugs.

The KING has been graciously pleased to give orders for the following promotion in, and appointment to, the Most Honourable Order of the Bath:—

*To be Additional Member of the Military Division of the Third Class, or Companion, of the said Most Honourable Order:—*

Maj.-Gen. David Turnbull Richardson, M.C., M.B., K.H.S. (3014), late Royal Army Medical Corps.

The KING has been graciously pleased to give directions for the following promotion in, and appointment to, the Most Distinguished Order of Saint Michael and Saint George:—

*To be Additional Member of the Third Class, or Companion, of the said Most Distinguished Order:—*

Lt.-Col. William Ellis, R.A.M.C. (retired), Press Attaché at His Majesty's Consulate-General, Tangier.

The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire:—

*To be Additional Commander of the Military Division of the said Most Excellent Order:—*

Colonel (temp. Brig.) John Struthers Fulton, M.D., M.R.C.P.Edin. (39158), Royal Army Medical Corps, Territorial Army.

*To be Additional Officers of the Military Division of the said Most Excellent Order:—*

Lt.-Col. (temp. Col.) Joseph Alexander Bing-

ham, T.D., M.B., F.R.F.P.S., F.R.C.S.Edin. (7379), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Leslie Fletcher, M.B. (106153), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Ian Morrison Orr, M.D., M.Ch., F.R.C.S. (246240), Royal Army Medical Corps.

Major (temp. Lt.-Col.) James Elliott Snow (44393), Royal Army Medical Corps.

Lt.-Col. (temp. Col.) Thomas James Logan Thompson, M.C., M.B. (14379), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Thomas Raymond Wall, B.D.Sc. (39753), The Army Dental Corps.

*To be Additional Members of the Military Division of the said Most Excellent Order:—*

Capt. Oliver Garrod (88017), Royal Army Medical Corps.

Major Thomas Theodore Schoales Hall, M.D. (58946), Royal Army Medical Corps, Territorial Army.

Capt. (temp. Major) Edward Watson Hart, M.B., M.R.C.P. (106792), Royal Army Medical Corps.

Miss Alexina Elizabeth Hawkins (Sister) (4/1903), Queen Alexandra's Imperial Military Nursing Service Reserve.

Capt. (temp. Major) Andrew Derek Kelly, M.B. (70783), Royal Army Medical Corps, Territorial Army.

Capt. (temp. Major) Albert James Lawlor (154198), Royal Army Medical Corps.

Capt. (temp. Major) William D'Auvergne Maycock, M.D. (99684), Royal Army Medical Corps.

Capt. (temp. Major) Derek John Wigginton (74417), Royal Army Medical Corps, Territorial Army.

The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) to the undermentioned:—

4963254 S/Sjt. Tom Corby, The Army Dental Corps.

5329276 S/Sjt. Christopher George Flote, Royal Army Medical Corps.

7407528 Pte. James Gall Kidd, Royal Army Medical Corps.

7536216 S/Sjt. Guinness George Lashmar, The Army Dental Corps.

7395776 Sjt. Stanley Nuttall, Royal Army Medical Corps.

7257053 S/Sjt. Eric Seaton, Royal Army Medical Corps.

7344891 Sjt. David Sommerville, Royal Army Medical Corps.

10541457 Sjt. Gordon Hedley Stafford, Royal Army Medical Corps.

7372208 Sjt. Francis Bernard Trower, Royal Army Medical Corps.

The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Royal Red Cross:—

*To be Members of the Royal Red Cross, First Class:—*

*Queen Alexandra's Imperial Military Nursing Service.*

Miss Charlotte Laura Barker, Sister (acting Matron) (206036).

Miss Kathleen Mary Brady, acting Principal Matron (206037).

Miss Dorothy Winifred Cheetham, Sister (acting Matron) (206061).

Miss Phoebe Jane Gibbs, Sister. (206161).

Miss Leonora Gladys Hughes, Matron (acting Principal Matron) (206205).

Miss Bessie Jones, A.R.R.C., Matron (acting Principal Matron) (206290).

Miss Mary Clair Kelly, Sister (acting Matron) (206258).

Miss Dorothy Kerridge, Sister (acting Principal Matron) (206257).

Miss Helen Fleming McFeat, Matron (acting Principal Matron) (206300).

Miss Gladys Miller, A.R.R.C., Matron (acting Principal Matron) (206297).

Miss Maude Browne Page, Sister (assistant Matron) (206375).

Miss Dorothy Mildred Smith, Sister (206468).

Miss Olive Mary Watson, Matron (206510).

Miss Bertha Joycelyn Caines, Sister (acting Matron) (206101), Q.A.I.M.N.S. Reserve.

Miss Sarah Ellen Jones, Matron (208558), Q.A.I.M.N.S. Reserve.

Miss Elizabeth Mowbray, Sister (208891), Q.A.I.M.N.S. Reserve.

Miss Dorothy Alice Ross, Sister (209081), Q.A.I.M.N.S. Reserve.

Miss Rosita Jenny Enriqueta Warde, A.R.R.C., Sister (acting Sister-in-charge) (209428), Q.A.I.M.N.S. Reserve.

*Territorial Army Nursing Service.*

Miss Margaret Brymer Anderson, Matron (241238).

Miss Mildred Hainsworth, Matron (213399).

Miss Edith May Prentice, Sister (acting Matron) (215121).

*To be Associates of the Royal Red Cross, Second Class.*

Miss Margaret Applebee, Sister (206006), Q.A.I.M.N.S.

Miss Marjorie Florence Creagh, Senior Sister, Q.A.I.M.N.S.

Miss Catherine Tullis Milligan, Sister (208839), Q.A.I.M.N.S.

Miss Kathleen Alicia Morrow, Sister (acting Senior Sister) (206304), Q.A.I.M.N.S.

Miss Mabel Ruth Briggs, Sister (acting Matron) (301206), Q.A.I.M.N.S. Reserve.

Mrs. Margaret Dean, Sister (317604), Q.A.I.M.N.S. Reserve.

Mrs. Lucy Lacey, Sister (316442), Q.A.I.M.N.S. Reserve.

Miss Ann Looram, Sister (209594), Q.A.I.M.N.S. Reserve.

Miss Letitia Forbes Mickie, Sister (227612), T.A.N.S.

Miss Sarah Tufner, Sister (215623), T.A.N.S.

*December 1, 1944.*—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division) in recognition of gallant conduct in carrying out hazardous work in a very brave manner, to the under-mentioned:—

No. 4191641 Sjt. Jesse Evaps, Royal Army Medical Corps (Dromore, Co. Down).

No. 6911059 Pte. John Smillie, Royal Army Medical Corps (Deptford, Sunderland).

*December 7.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy:—

*The Military Cross*

Capt. Jacob Cowan (195823), Royal Army Medical Corps (Dublin).

Capt. Geoffrey Brooke Hirst, M.B. (211576), Royal Army Medical Corps (Dewsbury).

Capt. Edgar Wareing Moore, M.B. (266215), Royal Army Medical Corps (Clevedon, Som.).

Capt. Digby William Moynagh, M.B. (157583), Royal Army Medical Corps (Dorking).

Lt. William Aston Smurthwaite (291921), Royal Army Medical Corps (Long Ditton, Surrey).

Lt. Harry Thompson (313308), Royal Army Medical Corps (Southend-on-Sea).

*The Military Medal.*

7392912 Pte. Morris Allenbick, Royal Army Medical Corps (London, E.1).

7368614 Pte. William Meakin, Royal Army Medical Corps (Barry Island, Glam.).

7360955 Pte. Richard Francis Sutton, Royal Army Medical Corps (Hailsham).

*December 21.*—The KING has been graciously pleased to give orders for the following appointment to the Most Honourable Order of the Bath, in recognition of gallant and distinguished services in Italy:—

*To be Additional Member of the Military Division of the Third Class, or Companion, of the said Most Honourable Order:—*

Brig. (temp.) Rudolf William Galloway, C.B.E., D.S.O., M.B. (5839), late Royal Army Medical Corps.

*December 21.*—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Italy:—

*To be Additional Commander of the Military Division of the said Most Excellent Order:—*

Col. (temp.) John Baden Strickland Guy, O.B.E., T.D., M.B. (40285), Royal Army Medical Corps (Saltburn-by-Sea).

*To be Additional Officers of the Military Division of the said Most Excellent Order:—*

Col. (temp.) Geoffrey Anderton, M.B. (36781), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Frederick Herbert Bentley, M.B., F.R.C.S. (238796), Royal Army Medical Corps.

Major (temp. Lt.-Col.) Herbert Davis Chalke (87094), Royal Army Medical Corps.

Col. (temp.) Walter James Fairlie Craig, M.B. (8612), Royal Army Medical Corps.

Col. (temp.) James Campbell Gilroy, M.B., M.R.C.P. (39087), Royal Army Medical Corps (Oxford).

Major (temp. Lt.-Col.) Frank Geoffrey Holman (99409), Royal Army Medical Corps (Stanmore).

Major (temp. Lt.-Col.) James Gardner Jamieson (103695), Royal Army Medical Corps (Beckett Park, Berks).

Major (temp. Lt.-Col.) Frank Rodney Langmaid (52204), Royal Army Medical Corps (Waterloo-ville, Hants).

Lt.-Col. Daniel McVicker, M.C., M.B., F.R.C.S. Edin., (14146), Royal Army Medical Corps (Faringdon, Hants).

Lt.-Col. Gordon Barrett Mitchell-Heggs, M.D., M.R.C.P., F.R.C.P. (50271), Royal Army Medical Corps (London, W.1).

Major (temp. Lt.-Col.) Alfred James Pitkeathley, M.B. (75143), Royal Army Medical Corps (Abernethy, Perthshire).

Major (temp. Lt.-Col.) James Kirkwood Slater, M.D., F.R.C.P. (21433), Royal Army Medical Corps (Edinburgh).

Major (temp. Lt.-Col.) Douglas Thomas Swift, M.B. (63170), Royal Army Medical Corps (Richmond, Yorks).

*To be Additional Members of the Military Division of the said Most Excellent Order:—*

7261557 W.O.II (Qm.-Sjt.) (acting W.O.I, Sjt.-Maj.) Douglas James Anderson, Royal Army Medical Corps (Bognor Regis).

Capt. (temp. Major) Herbert John Bell, M.B. (89838), Royal Army Medical Corps (Dumbarton-shire).

Capt. Alexander Paterson Robertson Borrowman, M.B. (107326), Royal Army Medical Corps (London, N.6).

Capt. (temp. Major) Harold William Burge, M.B., F.R.C.S. (230346), Royal Army Medical Corps (New Malden, Surrey).

7262133 W.O.II (Qm.-Sjt.) Leslie Arthur Charles Caley, Royal Army Medical Corps (London, N.W.9).

Capt. (temp. Major) John Mounston Pemberton Clark, M.B., F.R.C.S. (106148), Royal Army Medical Corps (Leeds).

Capt. (temp. Major) George John Cunningham, M.D. (234730), Royal Army Medical Corps (Hove, Sussex).

Capt. (temp. Major) William Davidson (133549), Royal Army Medical Corps.

Capt. (temp. Major) David Joseph Davies (115977), Royal Army Medical Corps (Knowle).

Capt. (temp. Major) Frederick Charles Heatley, M.B. (133945), Royal Army Medical Corps (Dublin).

Capt. Michael Claude Hawker Kingdon, M.B. (257876), Royal Army Medical Corps (Holsworthy).

Capt. (temp. Major) James Norman Macartney, M.B. (131336), Royal Army Medical Corps (Oxford).

Capt. (temp. Major) Ivor Anderson MacDougall (199796), Royal Army Medical Corps (Dundee).

Capt. (temp. Major) William Lambert Ogle,

M.B. (98317), Royal Army Medical Corps (Old Windsor).

Capt. (temp. Major) Aaron Orlek, F.R.C.S. (119918), Royal Army Medical Corps (South Africa).

Capt. Francis Edward Pitt-Payne (133113), Royal Army Medical Corps (Bromley).

Major (acting Lt.-Col.) Charles Desmond Preston, M.B. (90167), Royal Army Medical Corps (Kendall).

Capt. Robert Hilton Ralph Renwick, M.B. (125338), Royal Army Medical Corps (Alston, Cumberland).

Capt. (temp. Major) James Alexander Ross, M.B., F.R.C.S. Edin. (85144), Royal Army Medical Corps (Wellingborough).

Sister Mrs. Audrey Styles (221078), Queen Alexandra's Imperial Military Nursing Service (Southampton).

Capt. (temp. Major) Robert Atkinson Tennent, M.B. (94086), Royal Army Medical Corps (Middlesbrough).

Capt. (temp. Major) Richard James Toleman, M.B. (107757), Royal Army Medical Corps.

Lt. (Qmr.) James Tomlinson (250429), Royal Army Medical Corps (Stockport).

Capt. (temp. Major) Brian McNeil Truscott, M.B., F.R.C.S. (86725), Royal Army Medical Corps (London, N.W.3).

Capt. (temp. Major) Robert Irvine Wilson, M.B. (127154), Royal Army Medical Corps (Belfast).

*December 21.*—The KING has been graciously pleased to approve the award of the George Medal, in recognition of conspicuous gallantry in carrying out hazardous work in Italy in a very brave manner, to:—

7358812 Cpl. Joseph Charles Hill, Royal Army Medical Corps (London, E.11).

*December 21.*—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division), in recognition of gallant and distinguished services in Italy, to the undermentioned:—

7354909 L/Sjt. Harold Carr, Royal Army Medical Corps (Birmingham).

7261342 Sjt. Alfred George Elkins, Royal Army Medical Corps (Nottingham).

7405373 Sjt. Frank Robert Hales, Royal Army Medical Corps (West Bridgeford).

7256920 Cpl. James William Stone, Royal Army Medical Corps (Birmingham).

7264508 Cpl. Percy John Turner, Royal Army Medical Corps.

*December 21.*—The King has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy:—

*The Distinguished Service Order.*

Major (temp. Lt.-Col.) Philip John Richards, O.B.E. (51985), Royal Army Medical Corps (Hailsham).

*The Military Cross.*

Capt. (temp. Major) Reginald Arthur Hooper (91102), Royal Army Medical Corps (Kent).

Capt. Jackson Braham, M.B. (227250), Royal Army Medical Corps (Leeds).

Capt. Aric Michael Glaser (202270), Royal Army Medical Corps (Weybridge).

Capt. Owen David Morris (133184), Royal Army Medical Corps (London, S.W.3).

Capt. Leslie Gordon Morrison, M.B. (248224), Royal Army Medical Corps (Edinburgh).  
 Capt. Desmond Francis O'Neill, M.B. (106849), Royal Army Medical Corps (London, S.W.3).

*The Royal Red Cross.*

*To be Additional Members of the Royal Red Cross, First Class:—*

Sister (acting Matron) Miss Mary Louise Hallows (206184), Queen Alexandra's Imperial Military Nursing Service (Chesterfield).

Matron Miss Jean Tosh Mitchell, A.R.R.C. (213942), Territorial Army Nursing Service (Glasgow).

Matron Miss Kate Elizabeth Shaw (206463), Queen Alexandra's Imperial Military Nursing Service (York).

*To be Additional Associates of the Royal Red Cross, Second Class:—*

Sister Miss Catherine Barry (206703), Queen Alexandra's Imperial Military Nursing Service (Leix, Eire).

Sister Mrs. Dorothy Gama Bass (208290), Queen Alexandra's Imperial Military Nursing Service.

Sister Miss Elinor Mary Bond (206632), Queen Alexandra's Imperial Military Nursing Service (Preston).

Sister Miss Jessie Cleal (203668), Queen Alexandra's Imperial Military Nursing Service (St. Albans).

Sister Miss Dorothy Donohue (208206), Queen Alexandra's Imperial Military Nursing Service (Australia).

Sister Miss Elsie Driver (206986), Queen Alexandra's Imperial Military Nursing Service (Sheffield).

Sister Miss Barbara Isobel Duncan (218043), Queen Alexandra's Imperial Military Nursing Service (Wirral).

Sister Miss Bessie Fraser (330721), Queen Alexandra's Imperial Military Nursing Service (Elland, Yorks).

Sister Miss Ruth Mabel Furze (206068), Queen Alexandra's Imperial Military Nursing Service (London, W.4).

Sister Miss Margaret Ganter (208249), Queen Alexandra's Imperial Military Nursing Service (Mexboro, Yorks).

Sister Miss Jane Graham (225444), Queen Alexandra's Imperial Military Nursing Service (Co. Antrim, N. Ireland).

Sister Miss Florence Amelia Hansford (215984), Queen Alexandra's Imperial Military Nursing Service (Brookmans Park).

Sister Miss Joan Winifred Hitchin (203593), Queen Alexandra's Imperial Military Nursing Service (Liverpool).

Sister Miss Kathleen Meen (213997), Territorial Army Nursing Service (Leeds).

Sister Miss Mary Anne Metcalfe (315002), Territorial Army Nursing Service (Doncaster).

Sister Miss Eva Doris Murray (208826), Queen Alexandra's Imperial Military Nursing Service (Shildon).

Sister Miss Janet Morrison Reid (209180), Queen Alexandra's Imperial Military Nursing Service (Aberdeen).

Sister Miss Clare Kerr Reynolds (234997), Queen Alexandra's Imperial Military Nursing Service (Glasgow).

Sister Miss Florence Blanche Rimmer (215312),

Territorial Army Nursing Service (Ainsdale).

Sister Miss Joan Elizabeth Roberts (215310), Territorial Army Nursing Service (Horam).

Sister Miss Mary Roche (203192), Queen Alexandra's Imperial Military Nursing Service (Ennis, Eire).

Sister Miss Edith Russell (209660), Queen Alexandra's Imperial Military Nursing Service (Colne, Lancs).

Sister Miss Jessie Louise Gordon Sharp (209328), Queen Alexandra's Imperial Military Nursing Service (Co. Tyrone, N. Ireland).

Sister (acting Matron) Miss Lilian Kate Shutter (215425), Territorial Army Nursing Service (Sherborne).

Sister Miss Florence Sibella Smith (215954), Queen Alexandra's Imperial Military Nursing Service (Newcastle-on-Tyne).

Sister Miss Kathleen Walsh (266466), Queen Alexandra's Imperial Military Nursing Service (Liverpool).

*Bar to the Military Medal.*

7368614 Pte. William Meakin, M.M., Royal Army Medical Corps (Barry Island).

*The Military Medal.*

7261121 Sjt. Leonard Sidney Gilbert, Royal Army Medical Corps (Lincoln).

7371332 Sjt. Joseph Charles Graham Lukins, Royal Army Medical Corps (Cardiff).

552835 L. Cpl. Joseph Lawson, Royal Army Medical Corps (Burgess Hill).

7389216 Pte. John Henry Mallett, Royal Army Medical Corps (Lancing).

December 21.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North-West Europe:—

*The Military Cross.*

Capt. (temp. Major) Francis Joseph Grahamsley Slater (79901), Royal Army Medical Corps (Southport).

Capt. Thomas Gordon Cameron (163367), Royal Army Medical Corps (Sunderland).

Capt. John Timothy Alban Lloyd (211566), Royal Army Medical Corps (Llanwnda).

Capt. Angus Norman McPhail (125490), Royal Army Medical Corps (Glasgow, C.1).

Capt. Henry Dendy Moore (101245), Royal Army Medical Corps (Waltham Abbey).

Capt. John Anthony Perpoli (131686), Royal Army Medical Corps (Darlington).

*The Military Medal*

7364210 Cpl. Alan Leslie Rehill, Royal Army Medical Corps (St. Boswells).

97003281 Pte. Bertram Henry Roe, Royal Army Medical Corps (London, S.W.18)

December 29.—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition of gallant conduct in carrying out hazardous work in a very brave manner:—

*To be Additional Members of the Military Division of the said Most Excellent Order:—*

Capt. Charles Terrence Anthony Burgess (133600), Royal Army Medical Corps (Hoylake, Cheshire).

Lt. Oliver Gray (305170), Royal Army Medical Corps (Haslemere, Surrey).

Capt. Andrew Anthony Grierson (101980), Royal Army Medical Corps (Wisborough Green, Sussex).

Sister Miss Ellen Theresa Hourigan (305029), Queen Alexandra's Imperial Military Nursing Service Reserve (Ballingarry, Eire).

Sister Miss Lily McNicholas (246129), Queen Alexandra's Imperial Military Nursing Service Reserve (Kiltimagh, Eire).

Sister Miss Elsie Robert (206427), Queen Alexandra's Imperial Military Nursing Service (Formby, Lancs).

**December 29.**—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division), in recognition of gallant conduct in carrying out hazardous work in a very brave manner, to the undermentioned:—

7383251 Pte. Herbert Kenneth Dodd, Royal Army Medical Corps (South Brent, Devon).

7523389 Pte. Walter Herbert Jibson, Royal Army Medical Corps (Cottingham, Yorks).

7523648 Sjt. Alistair Wallace Mitchell, Royal Army Medical Corps (Roseheart, Aberdeenshire).

7517269 S/Sjt. Benjamin Spink, Royal Army Medical Corps (Armley, Leeds).

**December 29.**—The KING has been graciously pleased to approve of the publication of the names of the undermentioned as having been posthumously commended for brave conduct:—

Sister Miss Dorothy Anyta Field (206151), Queen Alexandra's Imperial Military Nursing Service.

Sister Miss Mollie Evershed (306582), Queen Alexandra's Imperial Military Nursing Service Reserve.

**December 1.**—Col. J. S. McCombe, *D.S.O.*, *M.B.* (4328), late *R.A.M.C.* Res. of Offrs., reverts to ret. pay on ceasing to be employed and to be granted the hon. rank of Brig., Dec. 1, 1944.

**December 5.**—Col. (Local Brig.) S. Smith, *M.B.*, *F.R.C.P.*, *K.H.P.* (14376), late *R.A.M.C.*, having attained the age for retirement, is retained on the Active List supern. to establ., Dec. 5, 1944.

**Short Service Commn.**—Lt. (War Subs. Capt.) Harry Pozner, *M.C.* (101000), from *R.A.M.C.* (emergency commn.), is granted a short-service commn. in the rank of Lt., Oct 4, 1939, and to be Capt., Oct 4, 1940, with seniority next below Capt. R. K. Pilcher.

**December 8.**—Col. K. Comyr, *M.D.* (4956), late *R.A.M.C.*, on completion of four years in the rank, retires on ret. pay and remains employed, Nov. 9, 1941. (Substituted for the notifs. in *Gazette* (Supplement) dated Feb. 17, 1942, and Nov. 7, 1944.)

Col. (temp. Brig.) E. Phillips, *C.B.E.*, *D.S.O.*, *M.C.*, *M.B.* (8555), late *R.A.M.C.*, to be a *D.M.S.*, and is granted the acting rank of Maj.-Gen., Nov. 10, 1944.

**December 12.**—Col. J. S. K. Boyd, *O.B.E.*, *M.B.* (15763), late *R.A.M.C.*, is appointed Honorary Physician to the King with effect from Nov. 11,

1944, vice Maj.-Gen. Sir Percy S. Tomlinson, *K.B.E.*, *C.B.*, *D.S.O.*, *M.R.C.P.*, late *R.A.M.C.* retired.

Maj.-Gen. W. C. Hartgill, *O.B.E.*, *M.C.* (8648), late *R.A.M.C.*, is appointed Honorary Surgeon to the King with effect from Nov. 27, 1944, vice Maj.-Gen. O. W. McSheehy, *C.B.*, *D.S.O.*, *O.B.E.*, *M.B.*, late *R.A.M.C.*, retired.

Maj.-Gen. T. O. Thompson, *C.B.E.*, *D.M.* (4850), late *R.A.M.C.*, is appointed Honorary Physician to the King with effect from Dec. 12, 1944, vice Maj.-Gen. J. A. Manifold, *C.B.*, *D.S.O.*, *M.D.*, late *R.A.M.C.*, retired.

Col. (temp. Brig.) (acting Maj.-Gen.) E. Phillips, *C.B.E.*, *D.S.O.*, *M.C.*, *M.B.* (8555), late *R.A.M.C.*, to be Maj.-Gen., Dec. 12, 1944.

Lt.-Col. G. H. K. Smith, *O.B.E.*, *M.C.*, *M.B.* (15663) from *R.A.M.C.*, to be Col., Dec. 12, 1944, with seniority from May 20, 1942.

Col. (Local Maj.-Gen.) J. Walker, *C.B.E.*, *M.C.*, *M.B.* (1310), late *R.A.M.C.*, to be a *D.D.M.S.* and to be acting Maj.-Gen., Dec. 12, 1944.

Maj.-Gen. J. A. Manifold, *C.B.*, *D.S.O.*, *M.B.*, *K.H.P.* (9044), late *R.A.M.C.*, having attained the age for retirement, retires on ret. pay, Dec. 12, 1944.

**December 15.**—Capt. (Qmr.) T. Walkley (56906), to be Major (Qmr.), Dec. 16, 1944.

Capt. (Qmr.) J. W. Lockwood, *M.M.* (56944), to be Major (Qmr.), Dec. 16, 1944.

Major A. J. Williamson, *M.B.* (50579), *R.A.M.C.* (re-employed), reverts to ret. pay on ceasing to be employed on account of disability, Dec. 15, 1944, and is restored to the rank of Lt.-Col.

**December 22.**—War Subs. Lt.-Col. (Local Brig.) E. O. Ward, *D.S.O.*, *O.B.E.*, *M.C.*, *T.D.*, *F.R.C.S.* (24275), *R.A.M.C.*, relinquishes the local rank of Brig., Nov. 6, 1944.

**December 26.**—Lt.-Col. B. C. O. Sheridan, *M.C.*, *M.B.* (8749), having attained the age for retirement, is retained on the active list, supern. to establ., Dec. 24, 1944.

**December 29.**—Maj.-Gen. N. Cantlie, *M.C.*, *M.B.*, *F.R.C.S.* (4217), late *R.A.M.C.*, is appointed Honorary Physician to the King with effect from Dec. 5, 1944, vice Col. (Local Brig.) S. Smith, *M.B.*, *F.R.C.P.*, late *R.A.M.C.*, retired.

Major C. W. Greenway (27885), to be Lt.-Col., Dec. 24, 1944.

Major S. P. Sykes, *M.B.* (18796), reverts to ret. pay on ceasing to be employed, Dec. 15, 1944, and is restored to the rank of Lt.-Col.

### Regular Army Reserve of Officers.

**December 8.**—Col. K. Comyn, *M.D.* (4956), late *R.A.M.C.*, reverts to ret. pay on ceasing to be employed on account of disability, Dec. 17, 1943 (Substituted for the notifi. in *Gazette* (Supplement) dated Dec. 17, 1943.)

**December 22.**—Col. K. Comyn, *M.D.* (4956), late *R.A.M.C.*, ceases to belong to the Res. of Offrs. on account of disability, Dec. 17, 1943.

## THE ARMY DENTAL CORPS.

### Short Service Commns.—

**December 1.**—The undermentioned offrs. from A.D. Corps are granted short service commns. in the rank of Lt.:—

Lt. (War Subs. Capt.) Bertram Bland (79919),

from T.A. Res. of Offrs., Sept. 2, 1939, and to be Capt., Sept. 2, 1940.

Lt. (War Subs. Capt.) Walter Norman Trays (78702), from T.A. Res. of Offrs., Spt. 4, 1939, and to be Capt., Sept. 4, 1940.

Lt. (War Subs. Capt.) Cecil Roland Harold Fenton (79032), from T.A. Res. of Offrs., Sept. 7, 1939, and to be Capt., Sept. 7, 1940.

Lt. (War Subs. Capt.) Eldred Lennox Manton (107162), from Emergency Commn., Oct. 1, 1939, and to be Capt., Oct. 1, 1940.

Lt. (War Subs. Capt.) John Evelyn Harrison Bell (104832), from Emergency Commn., Nov. 6, 1939, and to be Capt., Nov. 6, 1940.

Lt. (War Subs. Capt.) Alexander Leslie Ross (104414), from Emergency Commn., Nov. 20, 1939, and to be Capt., Nov. 20, 1940.

Lt. (War Subs. Capt.) Bernard Hirschfield (107981), from Emergency Commn., Dec. 11, 1939, and to be Capt., Dec. 11, 1940.

Lt. (War Subs. Capt.) Lionel James Moir (107990), from Emergency Commn., Dec. 11, 1939, and to be Capt., Dec. 11, 1940.

Lt. (War Subs. Capt.) Patrick Henry Crampton (107975), from Emergency Commn., Dec. 11, 1939, and to be Capt., Dec. 11, 1940.

Lt. (War Subs. Capt.) Alan Robert Gillies (107978), from Emergency Commn., Dec. 11, 1939, and to be Capt., Dec. 11, 1940.

Lt. (War Subs. Capt.) Cecil Howard Greaves (114321), from Emergency Commn., Jan. 16, 1940, and to be Capt., Jan. 16, 1941.

Lt. (War Subs. Capt.) Philip Russell Potter (118024), from Emergency Commn., Feb. 15, 1940, and to be Capt., Feb. 15, 1941.

Lt. (War Subs. Capt.) David Neal Watson (116802), from Emergency Commn., Feb. 15, 1940, and to be Capt., Feb. 15, 1941.

Lt. (War Subs. Capt.) George Foster (118947), from Emergency Commn., Feb. 19, 1940, and to be Capt., Feb. 19, 1941.

Lt. (War Subs. Capt.) Rupert Anthony Coates Turton (119789), from Emergency Commn., Feb. 27, 1940, and to be Capt., Feb. 27, 1941.

Lt. (War Subs. Capt.) Hugh Griffiths Holland (123811), from Emergency Commn., Mar. 20, 1940, and to be Capt., Mar. 20, 1941.

Lt. (War Subs. Capt.) Kenneth Harold Champlin (123807), from Emergency Commn., Mar. 20, 1940, and to be Capt., Mar. 20, 1941.

Lt. (War Subs. Capt.) Richard Cyril Blackmore (125922), from Emergency Commn., Apr. 15, 1940, and to be Capt., Apr. 15, 1941.

Lt. (War Subs. Capt.) Kenneth Howse (125937), from Emergency Commn., Apr. 16, 1940, and to be Capt., Apr. 16, 1941.

Lt. (War Subs. Capt.) John George Windmill (127786), from Emergency Commn., May 1, 1940, and to be Capt., May 1, 1941.

Lt. (War Subs. Capt.) Dennis Henry Small (128128), from Emergency Commn., May 14, 1940, and to be Capt., May 14, 1941.

Lt. (War Subs. Capt.) Alfred George Thomas Allcorn (135125), from Emergency Commn., June 18, 1940, and to be Capt., June 18, 1941.

Lt. (War Subs. Capt.) Ranald Forbes Greig (135691), from Emergency Commn., June 24, 1940, and to be Capt., June 24, 1941.

Lt. (War Subs. Capt.) John Harold Whittle (136375), from Emergency Commn., July 1, 1940, and to be Capt., July 1, 1941.

Lt. (War Subs. Capt.) Fergus Milton Kay (141373), from Emergency Commn., July 24, 1940, and to be Capt., July 24, 1941.

Lt. (War Subs. Capt.) John Arthur Dossor (142614), from Emergency Commn., Aug. 14, 1940, and to be Capt., Aug. 14, 1941.

Lt. (War Subs. Capt.) Richard Basil Dupuis Stocker (163066), from Emergency Commn., Jan. 6, 1941, and to be Capt., Jan. 6, 1942.

Lt. (War Subs. Capt.) John Walker Marquis (173483), from Emergency Commn., Mar. 6, 1941, and to be Capt., Mar. 6, 1942.

Lt. (War Subs. Capt.) Jack Henry Forrester (223326), from Emergency Commn., Feb. 9, 1942, and to be Capt., Feb. 9, 1943.

*December 5.*—The undermentioned short service commn. offrs. are appointed to permanent commns. retaining their present seniority:—

July 1, 1944.—Capt. T. H. H. Wilson (70943).

July 18, 1944.—Capt. E. Ferguson (76736).

Oct. 3, 1944.—Capt. J. B. Hardie (78389).

Capt. R. D. Ogston (78388).

Nov. 1, 1944.—Capt. E. D. Stanhope (79116).

## SHORT SUMMARY OF THE TOUR OF THE R.A.M.C. BAND IN THE MIDDLE EAST. NOV., 1943, TO AUG., 1944.

It does not appear to be generally known that the Corps Band has recently made history, by being the first staff band to undertake an extensive tour of the Middle East, embracing Egypt, Persia, Irak, Palestine and Syria. They travelled to Port Said by one of the earliest convoys to take the Mediterranean route after the conclusion of hostilities in North Africa and with the enemy still holding suitable air bases they came in for a fair share of air attack. The ship's authorities made full use of the versatility of the band by providing facilities for them to give dances, orchestral and variety concerts and play for the church services, as well as performing the duties of stretcher bearers and first-aid parties. As a mark of appreciation for their good services on board, Major-General Majendie (the senior officer with them) presented Mr. Johnson with a baton made from a ship's oar, and inscribed "H.M.T. Highland Princess, 1943."

On their arrival in Cairo, the combined forces

of Army Welfare and the Department of National Service Entertainment undertook their complete routing, and decided to send them to Paiforce. The journey from Cairo to Baghdad of "30 Men and a Girl" as the party was now called (the girl was Miss Elisabeth Parry) would fill a few chapters, but suffice to say that owing to mechanical breakdowns in transport, weather conditions, and the general bad state of the roads, they took ten days over a journey originally scheduled to last four. Considerable ingenuity was shown by the men in cooking for themselves with the most primitive methods of heating. Sleeping accommodation alternated between the semi-luxurious and the almost impossible—in fact, owing to a series of accidents New Year's Eve was spent on the sand, next to a camel park, at a deserted outpost called Asluj. Shows were given en route wherever possible, frequently to an audience smaller in numbers than themselves.

Paiforce literally greeted them with open arms.

The few newspaper cuttings bear this out, and these represent but a fraction of the eulogies heaped on the Band during their three wonderful months in this command.

The triumphal tour continued through Syria, which included a climb from Beirut up 6,000 feet to give a show to a Mountain Warfare Training Battalion, an experience which some of the men found extremely arduous.

At the conclusion of their five weeks sojourn in Syria, the Band returned to Egypt, as their time abroad was drawing to a close, and they had still to visit the Canal Zone. Three hectic weeks were given to this, with Ismailia as the headquarters. Full advantage was taken of the marvellous bathing facilities in Lake Timsah, and 30 bronzed men and a girl left for Cairo once more, where they were to give some rather important concerts before embarking for home.

It was here they had the privilege of playing under the baton of the great American Maestro—Andre Kostelanetz—who, with his wife, Lily Pons, the famous operatic soprano, gave four per-

formances to British and American troops. This can certainly be accounted as one of the highlights of the tour.

Disappointment was frequently expressed by R.A.M.C. personnel that the Band was not routed exclusively to Corps units. This, of course, would have been contrary to the whole idea of the tour, as the intention was for them to play to the greatest number of troops of all nationalities in the short time at their disposal. However, the following figures may be of interest: Over 200 shows were given, more than 30 of which were at hospitals or exclusively to patients and hospital staffs. Some 20,000 miles were covered in the nine months. They played to as few as twenty white people in one place, and to as many as 10,000 at the Alamein Club. Broadcasts were given from five capitals—Cairo, Jerusalem, Baghdad, Teheran and Beirut.

And finally, to those who know the meaning of the word "Klephti," apart from minor personal losses, only one small envelope of music was lost in the whole of this lengthy and trying journey. Truly a magnificent effort.

## DEATHS.

**WILMOT.**—On Nov. 24, 1944, Colonel Reginald Cameron Wilmot, late R.A.M.C., Retired. Born Aug. 2, 1877, he took the M.R.C.S. England, and the L.R.C.P. London, in 1902, and entered the R.A.M.C. as Lieutenant, Jan. 31, 1903. Promoted Captain July 31, 1906, Major Oct. 31, 1914, Lieutenant-Colonel Aug. 18, 1925, and Colonel Aug. 28, 1930, he retired Aug. 2, 1934. He was appointed D.D.M.S., Malta, Sept. 15, 1930. He was created an Officer of the Order of St. John in 1934. He served in France and Belgium, May 5, 1916, till May 31, 1917, being mentioned in despatches and awarded the British War and Victory Medals. He also served in the third Afghan War in 1919, receiving the Medal with Clasp. He rejoined for a short period in 1940.

**O'KEEFE.**—On Nov. 29, 1944, in Camberley, Major-General Sir Menus William O'Keefe, *K.C.M.G., C.B.*, late R.A.M.C., Retired. Son of the late William O'Keefe, M.D., of Mount Keefe, Newmarket, Co. Cork, he was born Oct. 21, 1853. He was a lineal descendant of the Kings of Ireland. Having taken the M.D. of the Royal University of Ireland in 1880, he entered the Army as Surgeon Feb. 5, 1881. Promoted Surgeon Major Feb. 5, 1893, Lieutenant-Colonel Feb. 5, 1901, Colonel April 23, 1910, and Major-General March 1, 1915, he retired Aug. 3, 1919. He was Inspector of Medical Services, War Office, from July 28, 1910, till April 23, 1914. After retirement he was Colonel Commandant, R.A.M.C., 1927 till 1929. He served in Egypt in 1882, including the actions at Mahsarah and Kassassin and battle of Tel-el-Kebir. He took part in the Tirah Campaign of 1897-1898, including the capture of Sompagha and Arhanga Passes, operations in the Waran Valley and action of Nov. 16, 1897, and operations in the Bara Valley, Dec. 7 to 14, 1897. He again saw service in the Mohmand Campaign of 1908.

Lieutenant-General Sir James Hartigan, *K.C.B., C.M.G., D.S.O.*, writes:—

"The Corps has lost one of its few remaining 'grand old men' of the first world war by the death of Major-General Sir Menus O'Keefe, which took place on Nov. 29, 1944, at Camberley, at the age of 91.

"He had a very distinguished career in the Army, saw much active service on the N.W. Frontier of India and in Egypt, and filled the important appointment of Inspector of Medical Services from 1910 to 1914.

"It was, however, for his work in the 'great war' that he was best known. After being D.D.M.S. of a Corps for about 18 months, he was appointed D.M.S. Fourth Army in the early part of 1916 and held that appointment till the termination of hostilities. Thus it fell to his lot to organize and direct the arrangements for the collection, treatment, and disposal of the very large number of casualties throughout the whole period of the battle of the Somme. It was a colossal task, especially during the early stages of the battle, and was carried out most successfully. In this work he had the able assistance of Major H. B. Fawcus as his D.A.D.M.S. I saw a good deal of him during that time and used to be impressed by his grasp of the situation, both military and medical, by his unflinching cheerfulness and by his imperturbability. It took a great deal to ruffle him. While controlling the machine he left details to others. He never interfered unduly with his D.Ds.M.S., among whom he encouraged initiative. He got on extremely well with his Army Commander (Rawlinson) and his relationship with his own staff was of the happiest kind.

"Menus was a charming personality much beloved by all who knew him and was a keen sportsman. I often rode with him during the Somme days, when he was generally attended by a couple of greyhounds, and I believe the Army Commander once expressed doubt as to



whether he invariably complied with the instruction that no hares were to be coursed in the battle area!

"During the course of the war he suffered a grievous loss in the death of his only son.

"The sympathy of the Corps will go out to Lady O'Keefe and his daughter in their sorrow."

**FYFFE.**—On Dec. 4, Major Eric Leigh Fyffe, R.A.M.C., Retired. Born Dec. 12, 1884, he took the M.B. London in 1909, and was commissioned Lieutenant, R.A.M.C., July 29, 1910. Promoted Captain Jan. 29, 1914, and Major July 29, 1922, he retired Oct. 20, 1928. On retiring he settled in Hove and became Medical Officer, Crescent Convalescent Home, and Visiting Medical Officer, St. Dunstan's Annexe, Blinded Soldiers and Sailors, Brighton. He served in East Africa from 1914 till 1917 and was awarded the Fourth Class of the Belgian Order of the Crown, 1914-15 Star, British War and Victory Medals.

**GRELLIER.**—In India, on Dec. 6, 1944, Lieutenant-Colonel Ernest Franz Waldemar Grellier, R.A.M.C., M.B. Born May 17, 1886, he took the M.R.C.S. England, and the M.R.C.S. London, in 1911, the B.Ch.Cantab. in 1912, and the M.B. in 1937. Commissioned Lieutenant, R.A.M.C., S.R., Aug 21, 1913, he was mobilized Aug. 7, 1914, and promoted Captain April 1, 1915. He became Lieutenant, R.A.M.C., and temporary Captain Jan. 1, 1917. Promoted Captain, R.A.M.C., Feb. 7, 1918, Major Aug. 7, 1926, and Lieutenant-Colonel May 26, 1936. He served in France and Belgium, Aug. 13, 1914, till Dec., 1915, and in Mesopotamia Jan. to April, 1916, being awarded the 1914 Star, British War and Victory Medals.

**BOYLAN SMITH.**—Suddenly, on Dec. 13, 1944, at 3, Links Road Prestwick, Ayrshire, Lieutenant-Colonel Samuel Boylan Smith, D.S.O., O.B.E., M.D., R.A.M.C., Retired. Born Dec. 12, 1872, he took the M.D. Dublin in 1898 and the D.P.H. in 1909. Commissioned Lieutenant, R.A.M.C., Nov. 29, 1900, he was promoted Captain Nov. 29, 1903, Major Aug. 29, 1912, Lieutenant-Colonel Oct. 15, 1918, and retired Dec. 12, 1927. He held the Retired Pay appointment in Ayr from March 1, 1929, till Dec. 11, 1937. He served on the North West Frontier of India in the Mohmand country in 1908, being awarded the Medal with Clasp. He served in France and Belgium from Oct. 1, 1915, till Aug. 27, 1917, and from Feb. 12, 1918, till April 21, 1921. He was wounded and twice mentioned in despatches. He received the D.S.O., O.B.E., 1914-15 Star, British War and Victory Medals.

**FAWCETT.**—Very suddenly, in Guildford, on Dec. 13, 1944, Lieutenant-Colonel Charles Ernest White Spunner Fawcett, M.B., R.A.M.C., Retired. Born April 18, 1878, he took the M.B. Dublin in 1904. Commissioned Lieutenant, R.A.M.C., July 31, 1905, he was promoted Captain Jan. 31, 1909, Major Oct. 15, 1915, Lieutenant-Colonel May 18, 1929, and retired March 6, 1931. He held the Retired Pay appointment at Guildford from April 18, 1933, till June 25, 1942. He served with the Aden Field Force from Oct., 1915, till Nov., 1917. Mentioned in despatches, he received the French War Cross, 1914-15 Star, British War and Victory Medals.

**RIDDICK.**—On Dec. 20, 1944, Lieutenant-Colonel George Bushman Riddick, R.A.M.C., Retired. Son of Brigade Surgeon Lieutenant-Colonel John Riddick, A.M.D., he was born Sept. 18, 1871. Having taken the L.R.C.P. London, and the M.R.C.S. England, in 1894, he was commissioned Surgeon Lieutenant July 29, 1896. Promoted Captain, R.A.M.C., July 29, 1899, Major July 29, 1908, and Lieutenant-Colonel March 1, 1915, he retired Dec. 21, 1922, and on Jan. 5, 1923, he took up the Retired Pay appointment at Hilsea, which he held till Sept. 17, 1936. He served in France and Belgium from Aug. 15, 1914, till March 6, 1916, and on the Macedonian Front from April 20, 1917, till the cessation of hostilities. Mentioned in despatches he was awarded the 1914 Star, British War and Victory Medals.

**DORMAN.**—In Rampart House, Kinsale, Co. Cork, on Dec. 30, 1944, in his 93rd year, Major-General John Cotter Dorman, C.M.G., late R.A.M.C., Retired. Son of E. B. Dorman, of Kinsale, he was born March 20, 1852. Having taken the M.B., M.Ch., Dublin, in 1874, he entered the Army as Surgeon March 31, 1875. Promoted Surgeon Major March 31, 1887, Surgeon Lieutenant-Colonel March 31, 1895, Brigade Surgeon Lieutenant-Colonel June 13, 1898, Colonel Aug. 11, 1903, and Surgeon General April 11, 1908, he retired March 20, 1912. He was appointed Honorary Physician to the King, March 6, 1910. In Afghanistan in 1878 and 1879 he served with the Quetta and Kuram Columns during the second campaign and was present at the actions of Ali Khel and the Shutargardan, earning high praise and receiving the Medal. He saw service again in Egypt in 1882, being awarded the Medal and Bronze Star. In South Africa, 1899-1902, he was (1) in charge of a General Hospital, (2) Principal Medical Officer of a Division, and (3) Sections Lines of Communications. He took part in the operations at Paardeberg (Feb. 14 to 27, 1900), actions at Poplar Grove, Dreifontein, and Zilikats Nek. Mentioned in despatches, he was created C.M.G., and awarded the Queen's Medal with four Clasps and the King's Medal with two Clasps.

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# JOURNAL

## OF THE

# ROYAL ARMY MEDICAL CORPS

### Corps News.

FEBRUARY, 1945.

#### EXTRACTS FROM "THE LONDON GAZETTE."

*January 11, 1945.*—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Italy:—

#### *Royal Army Medical Corps.*

Brig. (acting) J. J. Magner, *M.C.*, M.B. (8718).  
 Brig. (acting) J. G. Morgan, *O.B.E.*, *T.D.*, M.B. (35510).  
 Col. (temp.) C. B. C. Anderson, *O.B.E.*, M.B., F.R.C.S. (5755).  
 Col. (temp.) A. Angus, *T.D.*, M.B. (32613).  
 Col. (temp.) J. T. McQuat, *O.B.E.*, *T.D.*, M.B., F.R.C.S. (36018).  
 Col. (temp.) R. M. Savege, *O.B.E.*, *M.C.*, M.B., F.R.C.S. (25805).  
 Col. (temp.) C. H. K. Smith, *O.B.E.*, *M.C.*, M.B. (15663).  
 Col. (temp.) J. R. N. Warburton, *M.C.* (1036).  
 Col. (acting) G. G. Drummond (20289).  
 Lt.-Col. J. H. Ward, *D.S.O.*, *M.C.*, M.B. (1367).  
 Major (temp. Lt.-Col.) W. A. Ball, *T.D.*, M.B. (40260).  
 Major (temp. Lt.-Col.) W. S. Brindle, M.B. (110061).  
 Major (temp. Lt.-Col.) H. A. Brittain, M.B., F.R.C.S. (195579).  
 Major (temp. Lt.-Col.) J. D. Easton, *O.B.E.*, M.B. (87179).  
 Major (temp. Lt.-Col.) W. Graham (69940).  
 Major (temp. Lt.-Col.) L. J. Haydon, M.B. (94678).  
 Major (temp. Lt.-Col.) L. G. Irvine, M.B. (F6537).  
 Major (temp. Lt.-Col.) D. MacD. Lyon, M.B. (115201).  
 Major (temp. Lt.-Col.) D. M. Mitchell, M.B. (56191).  
 Major (temp. Lt.-Col.) W. Patrick, M.B., F.R.F.P.S., F.R.C.S. (56474).  
 Major (temp. Lt.-Col.) G. W. Molyneux, M.B. (55927).  
 Major (temp. Lt.-Col.) E. F. S. Morrison, *M.C.*, M.B. (62831).  
 Major (temp. Lt.-Col.) J. J. O'Connell, *O.B.E.*, M.B. (64940).  
 Major (temp. Lt.-Col.) J. Pyle, *M.C.*, M.B. (128256).

Major (temp. Lt.-Col.) J. H. Sangster, M.B. (111787).  
 Major (temp. Lt.-Col.) A. Wilcox, M.D., M.R.C.P. (87547).  
 Major (temp. Lt.-Col.) P. H. Wood, M.D., B.S., F.R.C.P. (225763).  
 Capt. (temp. Major) (acting Lt.-Col.) N. G. G. Talbot, M.B. (86207).  
 Major S. S. Chesser, M.B. (76612).  
 Major (Qmr.) S. H. Heighway, *T.D.* (28010).  
 Capt. (temp. Major) S. Alstead, M.D., M.R.C.P., F.R.F.P.S. (236879).  
 Capt. (temp. Major) A. H. Baker, M.B., F.R.C.S. (231977).  
 Capt. (temp. Major) E. L. Carter, M.D. (218904).  
 Capt. (temp. Major) F. A. Denz, M.B. (191720).  
 Capt. (temp. Major) J. F. Ford (127760).  
 Capt. (Qmr.) (temp. Major) A. E. Green (127926).  
 Capt. (temp. Major) E. M. Griffin, M.B. (127732).  
 Capt. (temp. Major) W. F. Hamilton (102608).  
 Capt. (temp. Major) W. A. Heggie, *M.C.*, M.B. (96612).  
 Capt. (temp. Major) C. C. Hurst (87655).  
 Capt. (temp. Major) D. B. Jagger, M.B. (99110).  
 Capt. (temp. Major) D. Jefferiss, M.B. (77850).  
 Capt. (Qmr.) (temp. Major) A. W. Langley (99208).  
 Capt. (temp. Major) R. C. Little, M.B. (104546).  
 Capt. (temp. Major) J. C. MacKillop, M.B. (93252).  
 Capt. (temp. Major) B. J. Malley, M.D., M.B., M.R.C.P. (173471).  
 Capt. (temp. Major) D. Matheson, M.B. (73578).  
 Capt. (temp. Major) J. M. McKiddie, M.B. (125011).  
 Capt. (temp. Major) J. D. N. Nabarro, M.B. (91235).  
 Capt. (Qmr.) (temp. Major) W. A. V. Payne (99218).  
 Capt. (Qmr.) (temp. Major) E. Percy (125537).  
 Capt. (Qmr.) (temp. Major) W. H. Robertson (125294).  
 Capt. (temp. Major) A. I. Ross, M.B. (241165).  
 Capt. (temp. Major) H. M. D. Shepherd, M.D., M.R.C.P. (111790).  
 Capt. (temp. Major) N. J. Y. Simpson, M.B. (171527).  
 Capt. (temp. Major) A. Stuart, M.B. (104592).  
 Capt. (Qmr.) (temp. Major) J. H. Vickers (99203).

- Capt. (temp. Major) H. Waters, M.B. (89035).  
 Capt. (temp. Major) W. R. West-Watson, *M.B.E.*, M.B. (89803).  
 Capt. (temp. Major) J. H. Whittles (79640).  
 Capt. (temp. Major) E. G. Wright, M.B. (87017).  
 Capt. H. Auger, M.B. (223998).  
 Capt. E. Batley (1953586).  
 Capt. O. H. Belam (68070).  
 Capt. (Qmr.) D. H. Buggy (178551).  
 Capt. C. Cameron, M.B. (188513).  
 Capt. J. W. M. Christie, M.B. (236348).  
 Capt. (Qmr.) L. C. Coleman (178547).  
 Capt. T. B. Davidson, M.B. (216867).  
 Capt. K. B. Dawson, M.B. (225239).  
 Capt. D. C. Devine, M.B. (216194).  
 Capt. G. F. Edwards, *M.B.E.*, M.B. (78760).  
 Capt. J. T. A. Essex, M.B. (216358).  
 Capt. C. Giles, M.B. (231945).  
 Capt. S. J. G. Gilthour, M.B. (119908).  
 Capt. R. T. Grime, M.B. (135677).  
 Capt. A. Henderson, M.B. (202517).  
 Capt. A. W. F. Heron, M.B. (159535).  
 Capt. E. W. Lindeck, M.B., M.R.C.P. (223528).  
 Capt. J. G. Macarthur, *M.C.*, M.B. (104552).  
 Capt. D. Macdonald, M.B. (236134).  
 Capt. J. McLean, M.B. (133494).  
 Capt. L. F. McWilliams, M.B. (100995).  
 Capt. F. E. Milson, M.B. (199799).  
 Capt. A. E. Rampling (90059).  
 Capt. E. M. Sewell, M.B. (238403).  
 Capt. J. M. M. Steven, M.B. (236886).  
 Capt. M. G. Sutton, M.B. (211784).  
 Capt. R. T. B. Watson, M.B. (161279).  
 Capt. C. W. M. Whitty, M.B. (169900).  
 Capt. M. Wirthheim (274498).  
 Lt. (Qmr.) (temp. Capt.) F. J. Downes (205860).  
 Lt. (Qmr.) F. Burfitt (254489).  
 Lt. C. Creffield (313272).  
 Lt. F. B. Lee (297431).  
 Lt. R. C. Medland (313293).  
 7261510 W.O.I (Sjt.-Maj.) A. H. Carter.  
 7346819 W.O.I (Sjt.-Maj.) C. H. Johnson.  
 7364734 W.O.I (Sjt.-Maj.) J. J. K. O'Daly.  
 3956398 W.O.I (Sjt.-Maj.) W. J. Power.  
 7261721 W.O.II (Qm.-Sjt.) (acting W.O.I (Sjt.-Maj.)) G. S. Jago.  
 51695 W.O.II (Qm.-Sjt.) (acting W.O.I (Sjt.-Maj.)) J. J. Manning.  
 7261080 W.O.II (Qm.-Sjt.) (acting W.O.I (Sjt.-Maj.)) S. J. Seaman.  
 7259051 W.O.II (Qm.-Sjt.) (acting W.O.I (Sjt.-Maj.)) G. A. Sunderland.  
 7346308 S/Sjt. (acting W.O.I (Sjt.-Maj.)) W. H. Allison.  
 7391997 Sjt. (acting W.O.I (Sjt.-Maj.)) J. M. Roberts.  
 7519574 W.O.II (Qm.-Sjt.) W. Birchall.  
 7261946 W.O.II (Qm.-Sjt.) C. D. Green.  
 7262047 W.O.II (Qm.-Sjt.) A. Malone.  
 7262064 W.O.II (Qm.-Sjt.) G. Murray.  
 7264028 W.O.II (Qm.-Sjt.) G. W. Norbury.  
 7344960 W.O.II (Qm.-Sjt.) D. Staff.  
 7266364 W.O.II (Qm.-Sjt.) R. B. Tarling.  
 7354211 W.O.II (Qm.-Sjt.) E. W. E. Wicks.  
 7258144 S/Sjt. R. Bartlett.  
 7259874 S/Sjt. J. S. Blount.  
 7374511 S/Sjt. J. T. Boyce.  
 7522570 S/Sjt. G. Carter.  
 7523152 S/Sjt. T. H. Edmondson.  
 7341428 S/Sjt. O. J. Francis.  
 3524376 S/Sjt. A. V. Hall.  
 7521236 S/Sjt. J. Maitland.  
 7258925 S/Sjt. J. Middleton.  
 7356717 S/Sjt. R. C. New.  
 7519999 S/Sjt. G. W. Rossington.  
 7346115 S/Sjt. A. G. Skinner.  
 7363849 S/Sjt. S. Williams.  
 7361330 Sjt. T. C. Benton.  
 7356844 Sjt. T. F. Bibby.  
 7518862 Sjt. G. J. Burgess.  
 7364420 Sjt. E. J. Dalley.  
 7516983 Sjt. D. J. Davies.  
 7257099 Sjt. F. M. Davis.  
 7348537 Sjt. F. Dunderdale.  
 7346802 Sjt. R. J. Evans.  
 7354608 Sjt. L. Fitzgerald.  
 7349815 Sjt. N. H. Jeffs.  
 7367915 Sjt. R. W. Jennings.  
 7359748 Sjt. S. V. Jones.  
 7259240 Sjt. W. C. Mann.  
 7535150 Sjt. E. M. Marcar.  
 7354633 Sjt. C. J. Morley.  
 10689242 Sjt. E. Nuttall.  
 7345260 Sjt. E. Payne.  
 7387139 Sjt. A. F. T. Rose.  
 7262365 Sjt. C. W. Tuck.  
 7386193 Sjt. H. J. H. Turner.  
 7519647 Sjt. M. Vangelder.  
 7373621 Sjt. E. Webb.  
 7359306 Cpl. (acting Sjt.) F. Hartley.  
 7370832 Cpl. (acting Sjt.) G. H. Oram.  
 7516416 L/Sjt. D. W. J. Lees.  
 7389736 L/Sjt. J. Swift.  
 7367435 Cpl. F. W. Barney.  
 7398284 Cpl. A. E. Dick.  
 7523496 Cpl. E. W. Garrett.  
 7520227 Cpl. J. Goodwin.  
 7358632 Cpl. A. A. C. M. Hayes.  
 7388417 Cpl. A. Heptinstall.  
 7358812 Cpl. J. C. Hill.  
 7265576 Cpl. M. Lacey.  
 7522851 Cpl. J. C. Magnuson.  
 7391565 Cpl. A. Margolis.  
 7387597 Cpl. F. A. Mercer.  
 7522292 Cpl. W. H. Minshull, *B.E.M.*  
 7356407 Cpl. P. J. Sawyer.  
 7388031 Cpl. H. Simm.  
 7371398 Cpl. L. J. Stacey.  
 7522856 Cpl. K. R. Stegges.  
 7361527 Cpl. J. R. Taplin.  
 7382510 Cpl. J. W. Thompson.  
 7518721 Cpl. H. Tracey.  
 7404749 Cpl. G. E. Wragg.  
 7401020 L/Cpl. G. G. Brown.  
 7390721 L/Cpl. M. Hegarty.  
 7373274 L/Cpl. F. W. Horton.  
 7370276 Pte. (acting L/Cpl.) A. McMillan.  
 7404587 L/Cpl. A. T. Milton.  
 7388880 L/Cpl. E. N. Moore.  
 7385570 L/Cpl. I. Newman.  
 7364506 L/Cpl. F. D. Pinnell.  
 7258860 L/Cpl. J. S. Sisk.  
 7402606 Pte. R. Smallwood.  
 7403479 L/Cpl. C. W. Smith.  
 7361433 L/Cpl. K. J. Smith.  
 7389741 Pte. J. Alderson.  
 7361452 Pte. F. H. Bartley.  
 7395266 Pte. J. Bootes.  
 7403430 Pte. E. Bowes.  
 936081 Pte. V. H. Bricker.  
 7402649 Pte. J. Charlton.  
 7378206 Pte. W. Clarke (killed in action).  
 1302823 Pte. L. C. Dann.  
 T293297 Pte. T. Durkin.

7522049 Pte. D. I. Evans.  
 7369222 Pte. V. R. W. Fish.  
 7400763 Pte. J. D. Folkard.  
 7520153 Pte. J. R. Gray.  
 7520706 Pte. C. Green.  
 5575103 Pte. A. L. Greenhill.  
 7349510 Pte. F. Halpin.  
 Pal/12524 Pte. I. J. Handfus.  
 7404194 Pte. E. Hessey.  
 7400505 Pte. M. N. Holdstock.  
 7394564 Pte. E. Hutchfield.  
 7403855 Pte. K. H. Huxter.  
 7522928 Pte. F. D. Naylor.  
 7376064 Pte. A. L. Peters.  
 7382749 Pte. S. G. Reed.  
 7386385 Pte. J. M. B. Rice.  
 7516809 Pte. T. Scott.

*The Army Dental Corps.*

Capt. R. M. Fisher (150136).  
 Capt. F. W. Rushby (115223).  
 10511184 S/Sjt. E. C. Barney.  
 7536202 Sjt. H. A. King.  
 7538530 Cpl. A. G. Ferguson.  
 7538553 Cpl. R. C. Heather

*Queen Alexandra's Imperial Military Nursing Service.*

Miss Y. K. Davey, Sister (acting Matron) (206119).  
 Miss A. F. Adamson, Sister (206003).  
 Miss L. Aconley, Sister (215239).  
 Miss E. Barker, Sister (244283).  
 Mrs. C. M. Cameron, Sister (206816).  
 Miss N. E. Carlisle, Sister (238662).  
 Miss H. W. Collie, Sister (213042).  
 Miss M. D. Crawford, Sister (213031).  
 Miss E. G. Easthaugh, Sister (208049).  
 Miss F. S. Elliott, Sister (208054).  
 Miss M. Fanthorpe, Sister (230718).  
 Miss M. Finlayson, Sister (230719).  
 Miss E. M. McA. Gibson, Sister (236434).  
 Miss G. L. Hale, Sister (234568).  
 Miss J. Hamilton, Sister (208482).  
 Miss J. E. Harries, Sister (213446).  
 Miss P. C. Hay, Sister (213400).  
 Miss E. A. Knightbridge, Sister (213886).  
 Miss N. M. Liddiard, Sister (213464).  
 Miss M. S. Lomax, Sister (213782).  
 Miss L. I. Manning, Sister (239006).  
 Miss M. M. J. McRae, Sister (213924).  
 Miss M. Mitchell, Sister (209637).  
 Miss G. M. Petley, Sister (209019).  
 Miss I. 'D. Potts, Sister (244265).  
 Miss E. N. Russell, Sister (218306).  
 Miss L. Skells, Sister (209311).  
 Miss B. M. Tancred, Sister (213565).  
 Miss M. E. Theobald, A.R.R.C., Sister (209383).

*Territorial Army Nursing Service.*

Miss M. B. Robertson, R.R.C., Matron (215281).  
 Miss M. L. Naismith, Asst. Matron (temp. Matron) (215008).  
 Miss H. F. McGhie, Sister (213820).  
 Miss F. M. Page, Sister (215118).  
 Miss H. F. Stinson, Sister (215500).  
 Miss M. Whamond, Sister (215733).

January 25.—The KING has been graciously pleased to give orders for the following appointment to the Most Excellent Order of the British

Empire, in recognition of gallant and distinguished services in the field:—

*To be Additional Commander of the Military Division of the said Most Excellent Order:—*

Colonel (acting) David Proudfoot Levack, M.B. (30108), Royal Army Medical Corps.

The KING has been graciously pleased to give orders for the following promotion in the Most Excellent Order of the British Empire, in recognition of distinguished services:—

*To be an Additional Officer of the Military Division of the said Most Excellent Order:—*

Major (temp. Lt.-Col.) John Anderson Chapel, M.B.E. (35742), Royal Army Medical Corps.

January 25.—The KING has been graciously pleased to confer the Efficiency Decoration upon the following officers of the Territorial Army:—

*Royal Army Medical Corps.*

Lt.-Col. E. Walsh (51942).  
 Major (temp. Lt.-Col.) A. H. Charles (41945).  
 Major (temp. Lt.-Col.) E. J. G. Glass (38280).  
 Major (temp. Lt.-Col.) F. W. A. Warren (42373).  
 Major (temp. Lt.-Col.) J. F. Wilde (30973).  
 Major H. P. Gabb, M.C. (99320) (T.A.R.O.).  
 Capt. D. Jack (31075) (T.A.R.O.).  
 Capt. J. H. B. Livingston (42478) (T.A.R.O.).

February 1.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in North West Europe:—

*To be Additional Commanders of the Military Division of the said Most Excellent Order:—*

Brig. (temp.) Hugh Llewelyn Glyn Hughes, D.S.O., M.C. (111060), Royal Army Medical Corps (Res. of Offrs.).

Brig. (temp.) Arthur Espie Porritt, O.B.E. (125494), Royal Army Medical Corps.

Brig. (temp.) Quentin Vaughan Brooke Wallace, O.B.E., M.C., M.B. (13873), Royal Army Medical Corps.

*To be Additional Officers of the Military Division of the said Most Excellent Order:—*

Col. (temp.) Roderic Duncan Cameron, M.C., M.B. (8711), Royal Army Medical Corps (Inverness).

Major (temp. Lt.-Col.) Eric Catford (18266), Royal Army Medical Corps (Torquay).

Major (temp. Lt.-Col.) Wilfred Morgan Evans, M.C., M.B. (41885), Royal Army Medical Corps (Rotherham).

Col. (temp.) Cyril Helm, D.S.O., M.C. (36273), Royal Army Medical Corps (Res. of Offrs.) (Colchester).

Major (temp. Lt.-Col.) Leslie Reginald Heber Keatinge (31039), Royal Army Medical Corps (Winchester).

Major (temp. Lt.-Col.) Sydney Charles Henry Lane, M.B. (95913), Royal Army Medical Corps (Salisbury).

Major (temp. Lt.-Col.) Alastair MacLennan, M.B. (63253), Royal Army Medical Corps (Andover).

Major (temp. Lt.-Col.) Philip Rene Mitchell, M.B. (49578), Royal Army Medical Corps (Stonehaven, Scotland).

Major (temp. Lt.-Col.) Ian Alexander Morris Paton, M.B. (107321), Royal Army Medical Corps (Denham, Bucks).

Col. (temp.) Kenneth Alexander MacDonald Tomory, M.B. (8118), Royal Army Medical Corps (Londonderry).

*To be Additional Members of the Military Division of the said Most Excellent Order:—*

Capt. (temp. Major) Francis James Sandison Bowman, M.B. (90503), Royal Army Medical Corps (Aberdeen).

Capt. (temp. Major) Nigel Ross Butcher, M.B. (107222), Royal Army Medical Corps (Edinburgh).

Captain (temp. Major) Francis O'Keefe Craven, M.D. (141226), Royal Army Medical Corps (Cobh, Co. Cork).

Miss Amy Selina Dunnett (206927), Sister, Queen Alexandra's Imperial Military Nursing Service Reserve (Derby).

Major (temp. Lt.-Col.) William Simpson Harvey, M.B. (62899), Royal Army Medical Corps (Edinburgh, 10).

Capt. Frank Robert Barnard Howard Kennedy (244606), Royal Army Medical Corps (Wootton Bridge, I. of W.).

Capt. (temp. Major) Harold Kennedy, M.B. (181812), Royal Army Medical Corps (Portrush, Co. Antrim).

Miss Hilda Lonsdale (225465), Sister, Queen Alexandra's Imperial Military Nursing Service Reserve (Newcastle-on-Tyne).

Capt. (temp. Major) Richard Lennox MacPherson, M.B. (89932), Royal Army Medical Corps (Southwell, Notts).

Capt. (temp. Major) Harry Kirby Meller, M.B. (87871), Royal Army Medical Corps (St. Albans).  
7342521 W.O.I (R.S.M.) George Robert Taylor, Royal Army Medical Corps (Leeds).

7519527 W.O.II (Qm.-Sjt.) Edward Henry Wilson, Royal Army Medical Corps (Cheshire).

*February 1.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North West Europe:—

*The Distinguished Service Order.*

Major (temp. Lt.-Col.) Alexander McCorkindale Campbell (41791), Royal Army Medical Corps.

*The Military Cross.*

Capt. Peter Wallace Henderson (230076), Royal Army Medical Corps (Headington, Oxford).

Capt. James Johnston (63975), Royal Army Medical Corps (Edinburgh).

Capt. John Morgan Murphy, M.B. (169487), Royal Army Medical Corps (Tralee, Co. Kerry).

*February 2.*—The KING has been graciously pleased to approve the posthumous award of the George Cross, in recognition of most conspicuous gallantry in carrying out hazardous work in a very brave manner, to:—

Capt. Jenkin Robert Oswald Thompson (115213), Royal Army Medical Corps (Claygate, Surrey).

*January 5.*—War Subs. Major I. Fraser, D.S.O., O.B.E., M.D., F.R.C.S. (125832), Royal Army Medical Corps, to be Consultant, and is granted the local rank of Brig., Nov. 4, 1944.

*Short Service Comms.*—Capt. Ralph Hugh Berry (94928), from Supp. Res. of Offrs., to be Lt., Sept. 1, 1939, and to be Capt. Sept. 1, 1940.

War Subs. Capt. Thomas Edward Cleghorn, M.B. (248767), from Emerg. Commn. to be Lt., Oct. 17, 1942, and to be Capt. Oct. 17, 1943.

*January 12.*—Col. (temp. Maj.-Gen.) S. W. Kyle, M.B. (5068), late Royal Army Medical Corps, Res. of Offrs., relinquishes the temp. rank of Maj.-Gen., Jan. 12, 1945, on ceasing to be employed.

*January 19.*—Capt. P. Lapedus (73581) retires on account of disability, Jan. 18, 1945.

War Subs. Major M. F. Nicholls, M.S., F.R.C.S. (133545), Royal Army Medical Corps, to be a Consultant, and is granted the local rank of Brig., Nov. 27, 1944.

*January 23.*—Major E. G. Dalziel, M.C., M.B. (24431), to be Lt.-Col., Dec. 12, 1944.

*February 2.*—Lt.-Col. C. L. Emmerson (15651), having attained the age for retirement is retained on the Active List supern. to establ., Feb. 2, 1945.

Major A. E. Campbell, M.D. (30235) to be Lt.-Col. Feb. 2, 1945.

Capt. R. O. A. Leroux, M.B. (64089), to be Major, Jan. 4, 1945.

Capt. R. E. Waterston, M.B. (68582), to be Major, Feb. 1, 1945.

*February 6.*—War Subs. Major G. W. Bamber, M.D., M.R.C.P. (231445), Royal Army Medical Corps, to be a Consultant, G.H.Q., Oct. 31, 1944, and is granted the local rank of Brig.

**Regular Army Reserve of Officers.**

*January 5.*—Major H. D. Lane, M.C. (22298), ceases to belong to the Res. of Offrs., Jan. 6, 1945, on account of disability.

*January 12.*—Col. S. W. Kyle, M.B. (5068), late Royal Army Medical Corps, having exceeded the age limit of liability to recall, ceases to belong to the Res. of Offrs., Jan. 12, 1945, and is granted the hon. rank of Maj.-Gen.

## THE ARMY DENTAL CORPS.

*January 2, 1945.*—Capt. N. T. McNie (64094) to be Major, Jan. 1, 1945.

## PRISONERS OF WAR.

Acting Lt.-Col. A. T. Marrable, N.W. Europe.  
Temp. Major W. J. S. Huddleston, N.W. Europe.  
Temp. Major J. E. Miller, N.W. Europe.

Capt. J. E. Buck, N.W. Europe.  
Capt. C. C. M. James, N.W. Europe.  
Capt. B. C. Jeffrey, N.W. Europe.  
Capt. J. G. Jones, N.W. Europe.

Capt. J. W. Logan, N.W. Europe.  
 Capt. D. N. Mackenzie, N.W. Europe.  
 Capt. G. B. D. Scott, N.W. Europe.  
 Capt. C. E. C. Wright, N.W. Europe.  
 Capt. C. E. C. Wright, N.W. Europe.

Capt. E. Haigh, Italy.

*Erratum.*—In the December, 1944, issue of the Corps News, the name of Captain S. R. Mawson was erroneously shown as Captain S. R. Manson.

### DEATHS ON ACTIVE SERVICE.

Major B. Freedman. Died.  
 Capt. A. D. Gould. Killed in action.  
 Major P. M. Gunn. Accidentally killed.  
 Major J. D. F. Armstrong. Died.  
 Capt. A. P. Thomson. Died, accident.  
 Capt. J. P. Irwin. Killed in action.

Capt. (Mrs.) E. M. Macartney. Died.  
 Capt. R. J. F. Howe. Killed in action.  
 Capt. A. Brown. Killed in action.  
 Capt. D. F. Wood. Killed in action.  
 Capt. J. H. Keesey. Died whilst P. of War.  
 Capt. S. Holtan. Died of wounds.

### DEATH.

**COTTERILL.**—In London, on Jan. 21, 1945, Lieutenant-Colonel Leonard Cotterill, M.B., R.A.M.C., Retired. Born Aug. 31, 1869, he took the M.B. Aberdeen, in 1899, and served as a Civil Surgeon Nov. 23, 1900, till Dec. 4, 1901. Commissioned Lieutenant, R.A.M.C., Dec. 5, 1901, he was promoted Captain Dec. 5, 1904, Major Dec. 5, 1913, and Lieutenant-Colonel Dec. 26, 1923. He was Surgeon to H.E. the Viceroy of India for six months in 1916. He retired Aug. 31, 1924.

From Oct., 1924, till March, 1925, he held the Retired Pay appointment at Sheerness. He served in South Africa in 1900 and 1901, receiving the Queen's Medal with two Clasps. He took part in the operations in Somaliland in 1903 and 1904, being awarded the Medal with Clasp. He again saw service against the Mohmands and Swatis in the vicinity of Hafiz Kor and Shabkadar Aug.-Sept., 1915, receiving the 1914-15 Star, British War and Victory Medals.



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# JOURNAL

## OF THE

# ROYAL ARMY MEDICAL CORPS

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### Corps News.

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MARCH, 1945.

#### EXTRACTS FROM "THE LONDON GAZETTE."

*March 8, 1945.*—The KING has been graciously pleased to approve the posthumous award of the VICTORIA CROSS to:—

No. 11006144 Lance-Corporal Henry Eric Harden, Royal Army Medical Corps (Northfleet, Kent).

"In North-West Europe on the 23rd January, 1945, the leading section of a Royal Marine Commando Troop was pinned to the ground by intense enemy machine gun fire from well concealed positions. As it was impossible to engage the enemy from the open owing to lack of cover, the section was ordered to make for some near-by houses. This move was accomplished, but one officer and three other rank casualties were left lying in the open.

"The whole Troop position was under continuous heavy and accurate shell and mortar fire. Lance-Corporal Harden, the R.A.M.C. orderly attached to the Troop, at once went forward, a distance of 120 yards, into the open under a hail of enemy machine gun and rifle fire directed from four positions, all within 300 yards, and with the greatest coolness and bravery remained in the open while he attended to the four casualties. After dressing the wounds of three of them, he carried one of them back to cover. Lance-Corporal Harden was then ordered not to go forward again and an attempt was made to bring in the other casualties with the aid of tanks, but this proved unsuccessful owing to the heavy and accurate fire of enemy anti-tank guns. A further attempt was then made to recover the casualties under a smoke screen, but this only increased the enemy fire in the vicinity of the casualties.

"Lance-Corporal Harden then insisted on going forward again, with a volunteer stretcher party, and succeeded in bringing back another badly wounded man.

"Lance-Corporal Harden went out a third time, again with a stretcher party, and after starting on the return journey with the wounded officer, under very heavy enemy small arms and mortar fire, he was killed. Throughout this long period Lance-Corporal Harden displayed superb devotion to duty and personal courage of the very highest order, and there is no doubt that it had a most steadying effect upon the other troops in the area at a most critical time. His action was directly respon-

sible for saving the lives of the wounded brought in. His complete contempt of all personal danger, and the magnificent example he set of cool courage and determination to continue with his work, whatever the odds, was an inspiration to his comrades, and will never be forgotten by those who saw it."

*February 8.*—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the MOST EXCELLENT ORDER of the BRITISH EMPIRE, in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India:—

*To be Additional Officers of the Military Division of the said Most Excellent Order:—*

Colonel (temporary) Robert Alexander Anderson, M.B. (26294) Royal Army Medical Corps.

Major (temporary Lieutenant-Colonel) John Alexander Baty, M.B. (227045) Royal Army Medical Corps (Rotherham, Yorks).

Major (temporary Lieutenant-Colonel) Joseph Gilles Maurice Alphonse Brunet (64091) Royal Army Medical Corps (Montreal).

Major (temporary Lieutenant-Colonel) Alexander Dyce Davidson, M.B. (44512) Royal Army Medical Corps (Aberdeen).

Captain (temporary Major) Albert Edwin Jowett (79899) Royal Army Medical Corps (Blagdon).

Colonel (temporary) William James Officer, M.B. (21400) Royal Army Medical Corps.

Major (temporary Lieutenant-Colonel) Matthew Herbert Patrick Sayers, M.B. (66473) Royal Army Medical Corps.

*To be Additional Members of the Military Division of the said Most Excellent Order:—*

Lieutenant (Quarter-Master) Frederick James Hopewell (259294) Royal Army Medical Corps (Nottingham).

Captain Howard Mitchell Jamison, M.B. (205567) Royal Army Medical Corps (Steeple Claydon, Bucks).

Captain Kevin McCaul (188398) Royal Army Medical Corps (Surbiton).

*February 8.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy:—

#### *The Military Cross.*

Lieutenant Kenneth Courtenay Stephenson (314505) Royal Army Medical Corps (Newcastle-under-Lyme).

*The Military Medal.*

No. 7346747 Sergeant George William Wright, Royal Army Medical Corps (Sutton).

No. 7369681 Corporal Albert Cockerill, Royal Army Medical Corps (Hull).

No. 7348776 Corporal Edward Smith, Royal Army Medical Corps (Edale, Derbyshire).

No. 7396565 Private William Farrell Blandy, Royal Army Medical Corps (Sheffield).

No. 7403087 Private James Craig, Royal Army Medical Corps (Blackpool).

February 8.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India :—

*The Military Cross.*

Captain (temporary Major) (acting Lieutenant-Colonel) Alexander Burns, M.B. (107223) Royal Army Medical Corps (Glasgow, E.2).

Captain John William Ralph Battram (216667) Royal Army Medical Corps (Mountain Ash, Glam.).

Captain Duncan Mitchell, M.B. (185100) Royal Army Medical Corps (Marino, Co. Down).

*The Royal Red Cross.*

*To be an Additional Member of the Royal Red Cross, First Class.*

Miss Anna McCrombie Summerfield (206437) Principal Matron, Queen Alexandra's Imperial Military Nursing Service (Edinburgh).

*To be an Additional Associate of the Royal Red Cross, Second Class.*

Miss Dorothy Jessie Baler (206663) Sister, Queen Alexandra's Imperial Military Nursing Service Reserve (W. Australia).

Miss Harriet Constance Pauline Bamford (225903) Sister, Territorial Army Nursing Service.

Miss Lovey Hopwood (301203) Sister, Queen Alexandra's Imperial Military Nursing Service Reserve (Burnley).

Miss Monica Mary Norah Kennelly (244247) Sister, Queen Alexandra's Imperial Military Nursing Service Reserve (Falmouth).

Miss Mary Elizabeth Lewis (206281) Sister, Queen Alexandra's Imperial Military Nursing Service (Sutton).

Mrs. Grace Lenore Moore (209982) Territorial Army Nursing Service.

Miss Dorothy Sylvia Norman (244260) Sister, Queen Alexandra's Imperial Military Nursing Service Reserve (Taunton).

Miss Mary Ellen O'Connor (206358) Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Swinford, Co. Mayo).

Miss Gwyneth Mary Parker (206384) Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (London, W.13).

Miss Esther Maitland Somerville (206440) Sister (acting Matron), Queen Alexandra's Imperial Military Nursing Service (Beverley).

Miss Mary Louisa Wilson (215852) Sister, Territorial Army Nursing Service (Llandudno).

February 22.—The KING has been graciously pleased to give orders for the following appointment to the MOST HONOURABLE ORDER OF THE BATH, in recognition of gallant and distinguished services in the field :—

*To be an Additional Member of the Military Division of the Third Class, or Companion, of the said Most Honourable Order :—*

Major-General William Clavering Hartgill, O.B.E., M.C. (8648) late Royal Army Medical Corps.

February 22.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the MOST EXCELLENT ORDER OF THE BRITISH EMPIRE, in recognition of gallant and distinguished services in the field :—

*To be Additional Officer of the Military Division of the said Most Excellent Order :—*

Major (temporary Lieutenant-Colonel) Benjamin William Rycroft (133612) Royal Army Medical Corps.

*To be Additional Member of the Military Division of the said Most Excellent Order :—*

Captain Thomas Barry McMurray, M.B. (238170) Royal Army Medical Corps.

The KING has been graciously pleased to approve that the following be MENTIONED in recognition of gallant and distinguished services in the field :—

Brig. (temp.) R. A. Hepple, O.B.E., M.C., M.B. (22839) late R.A.M.C.

Col. (temp.) T. Menzies, O.B.E., M.B. (8428).

Col. (temp.) T. Young, M.B. (10380).

Lt.-Col. (temp.) J. P. Parkinson, M.B. (74165).

Lt.-Col. (actg.) D. L. Owen, M.B. (135407).

Maj. (temp.) L. S. Rogers, M.B.E., M.B., F.R.C.S. (131335).

Maj. (temp.) O. S. Williams (188407).

Capt. D. Collins (216683).

Capt. J. R. Rickett (241092).

7382958 S.-Sergt. J. M. Maguire.

7360813 Corpl. J. Hindle (killed in action).

7368410 Lce.-Corpl. G. Utley.

March 1.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished conduct in North-West Europe :—

*Second Bar to the Distinguished Service Order.*

Brigadier (temporary) High Llewelyn Glyn Hughes, C.B.E., D.S.O., M.C. (111060) Royal Army Medical Corps (London, W.8.).

*The Military Cross.*

Captain (temporary Major) William James Hay (93074) Royal Army Medical Corps (Windermere).

Captain Guy Martin Killpack, M.B. (100994) Royal Army Medical Corps (Haywards Heath).

Captain George Patrick Mitchell, M.B. (169472) Royal Army Medical Corps (London, S.W.14).

Captain Hugh Norman Smith (263714) Royal Army Medical Corps.

Captain John Michael Willcox (171200) Royal Army Medical Corps (Birmingham).

Lieutenant Ferguson Hartley (274235) Royal Army Medical Corps (Burnley).

Lieutenant William Mutch Walker (282020) Royal Army Medical Corps (Aberdeen).

*The Military Medal.*

No. 7386392 Corporal (acting Serjeant) George Scanlon, Royal Army Medical Corps (Winchester).

No. 7375615 Corporal Francis Vincent Gleeson, Royal Army Medical Corps (Manchester).

No. 7394487 Private Ivor John Barnett, Royal Army Medical Corps (Bridgend).

No. 14394967 Private Bernard Ambrose Scott, Royal Army Medical Corps (Manchester).

No. 7372385 Private John Arthur Thomas, Royal Army Medical Corps (Liverpool, 14).

*March 1.*—The KING has been graciously pleased to give orders for the following appointment to the MOST EXCELLENT ORDER OF THE BRITISH EMPIRE, in recognition of gallant and distinguished services in the field :—

*To be Additional Member of the Military Division of the said Most Excellent Order :—*

Captain John Harold Derek Millar, M.D. (98370) Royal Army Medical Corps.

*March 1.*—The KING has been graciously pleased to approve that the following be MENTIONED in recognition of gallant and distinguished services in the field :—

Maj. (temp.) R. Stuppel, F.R.C.S. (131683) (Killed in action).

Capt. D. B. Watson, M.B. (136270).

*March 8.*—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Italy :—

*The Military Cross.*

Captain James Kendrick Pugh (248065) Royal Army Medical Corps (Builth Wells, Breconshire).

*March 15.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the field :—

*The Military Cross.*

Captain Peter Delap, M.B. (133538) Royal Army Medical Corps.

Captain Lionel Francis McWilliams, M.B. (100995) Royal Army Medical Corps.

*The Military Medal.*

No. 6085973 Sergeant Cyril Walter Reeves, Royal Army Medical Corps.

No. 7403479 Lance-Corporal Clifford William Smith, Royal Army Medical Corps.

*February 9.*—Col. J. G. Gill, C.B.E., D.S.O., M.C., M.B. (8368) late R.A.M.C. to be a D.D.M.S. and is re-granted the temp. rank of Maj.-Gen., 15th Jan. 1945.

• War Subs. Maj. E. E. Prebble, M.D. (105599) R.A.M.C. to be a Consultant, and is granted the local rank of Brig. 31st Oct. 1944.

*February 16.*—Lt.-Col. T. P. Buist, M.B. (15700) having attained the age for retirement is retained on the Active List, supern. to establt. 15th Feb. 1945.

Maj. R. A. Bennett, M.D., M.R.C.P., Edin. (31401) to be Lt.-Col. 15th Feb. 1945.

*February 20.*—Maj. W. A. D. Drummond (31405) to be Lt.-Col., 19th Feb. 1945.

Capt. O. R. L. L. Plunkett (63273) retires on account of disability 21st Feb. 1945, and is granted the hon. rank of Maj.

War Subs. Lt.-Col. R. Marnham, F.R.C.S. (133609) (R.A.M.C.) to be a Consultant and is granted the local rank of Brig., 27th Dec. 1944.

*February 27.*—Lt.-Col. A. J. Bado (5169) having attained the age for retirement is retained on the Active List (supern.) 19th Feb. 1945.

Capt. H. N. Perkins, M.B. (66484) to be Maj., 24th Feb. 1945.

War Subs. Capt. (now War Subs. Maj.) W. I. Daggett, M.B., F.R.C.S. (136194) R.A.M.C. to be a Consultant, and is granted the local rank of Brig., 23rd April 1944.

War Subs. Maj. R. Platt, M.D., F.R.C.P. (205680) R.A.M.C. to be a Consultant, and is granted the local rank of Brig., 5th Sept. 1944.

*March 2.*—Col. W. K. Morrison, D.S.O., M.B. (8126), late R.A.M.C. on completion of four years in the rank, is retained on the Active List supern., 1st Mar. 1945.

Col. E. Percival, D.S.O., M.C., M.B. (8128) late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern., 1st Mar. 1945.

Lt.-Col. J. B. Fotheringham, M.B. (5165) from R.A.M.C., to be Col., 1st Mar. 1945, with seniority 15th June 1942.

Lt.-Col. K. A. M. Tomory, O.B.E., M.B. (8118) from R.A.M.C. to be Col. 1st Mar. 1945, with seniority 20th June 1942.

Maj. J. G. E. Vachell (31444) to be Lt.-Col. 1st Mar. 1945.

Maj. (War Subs. Lt.-Col.) J. N. Atkinson, M.B. (31399) to be Lt.-Col. 1st Mar. 1945.

War Subs. Maj. J. L. Gordon, O.B.E. (65315) to be Maj., 1st Mar. 1945.

*March 6.*—Maj. J. T. Smyth, M.B. (34539) to be Lt.-Col. 4th Mar. 1945.

Lt.-Col. D. Crellin, M.C. (1645) having attained the age for retirement, is retained on the Active List (supern.) 4th Mar. 1945.

*March 9.*—Col. (temp. Maj.-Gen.) H. C. D. Rankin, C.I.E., O.B.E., M.B., V.H.S. (8129) late R.A.M.C., having completed four years in the rank of Col. is retained on the Active List (supern.), 8th Mar. 1945.

Lt.-Col. A. R. Ross, M.B. (9366) from R.A.M.C. to be Col. 8th Mar. 1945, with seniority, 3rd July 1942.

Maj. (War Subs. Lt.-Col.) G. Anderton, M.B. (3681) to be Lt.-Col. 8th Mar. 1945.

Lt. (Qr.-Mr.) (War Subs. Capt. (Qr.-Mr.)), E. E. Spring, M.B.E. (86284) to be Capt. (Qr.-Mr.) 8th Mar. 1945.

Lt. (Qr.-Mr.) (War Subs. Capt. (Qr.-Mr.)) (War Subs. Maj.) H. Tottle (86362) to be Capt. (Qr.-Mr.) 8th Mar. 1943.

War Subs. Maj. (now War Subs. Lt.-Col.) R. M. B. MacKenna, M.D., F.R.C.P. (106642) R.A.M.C. to be a Consultant, and is granted the local rank of Brig., 13th June 1943.

*March 13.*—Col. (actg. Maj.-Gen.) E. A. Sutton, C.B.E., M.C. (8525) late R.A.M.C. relinquishes the appt. of D.M.S. and the Actg. rank of Maj.-Gen. 4th Jan. 1945.

Col. E. A. Sutton, C.B.E., M.C. (8525) late R.A.M.C., to be a D.D.M.S. and is granted the actg. rank of Maj.-Gen. 26th Feb. 1945.

Col. R. A. Hepple, O.B.E., M.C., M.B. (22839) late R.A.M.C. having attained the age for retirement, is retained on the Active List (supern.) 13th Mar. 1945.

Lt.-Col. H. C. Godding, M.C. (5606) from R.A.M.C. to be Col., 13th Mar. 1945, with seniority 11th Mar. 1943.

### Regular Army Reserve of Officers.

*February 9.*—Capt. (War Subs. Maj.) W. E. Underwood, O.B.E., M.B., F.R.C.S. (26442) from Supp. Res. of Offrs., to be Capt., 9th Feb. 1942.

*February 27.*—Capt. C. D. Evans, M.B. (31739) from Supp. Res. of Offrs., to be Capt., 29th Jan. 1942.

War. Subs. Maj. P. H. Wells (91287) ceases to belong to the Res. of Offrs. on account of disability, 27th Feb. 1945, and is granted the hon. rank of Lt.-Col.

*March 9.*—Capt. (Bt.-Maj.) A. K. Forbes, *M.C.* (1672) relinquishes his commn. on account of disability, 10th Mar. 1945, and is granted the hon. rank of Maj.

*March 13.*—Col. F. R. Coppinger, *O.B.E.*, *M.B.* (1930) late R.A.M.C. having attained the age limit of liability of recall, ceases to belong to the Res. of Offrs. 10th May 1943.

Col. J. A. Renshaw (8783) late R.A.M.C. having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. 3rd Mar. 1944.

Col. G. F. Dawson, *M.C.*, *M.B.* (10953) late R.A.M.C. having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. 29th June 1944.

Maj.-Gen. H. C. R. Hime, *C.B.*, *D.S.O.*, *M.B.* (12843) late R.A.M.C. having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. 8th Nov. 1944.

Col. W. L. E. Fretz, *M.B.* (15682) late R.A.M.C., having exceeded the age limit of liability to recall, ceases to belong to the Res. of Offrs., 17th Nov. 1944.

Lt.-Col. E. F. W. MacKenzie, *O.B.E.*, *M.C.*, *M.B.* (23026) having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., 19th Feb. 1944.

Capt. W. P. Mulligan, *O.B.E.*, *M.B.* (51062) having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs. 8th Mar. 1944.

Maj. A. P. Draper, *M.C.*, *M.B.* (15658) having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., 23rd May 1944.

Maj. J. H. Pendered, *M.C.*, *M.B.*, *F.R.C.S.* (8780) having exceeded the age limit of liability to recall, ceases to belong to the Res. of Offrs., 6th July 1944, and is granted the hon. rank of Lt.-Col.

Maj. N. T. Whitehead, *M.C.*, *M.B.* (1688) having exceeded the age limit of liability to recall, ceases to belong to the Res. of Offrs., 26th Oct. 1944.

Maj. A. G. G. Thompson, *M.D.* (50576) having attained the age of liability to recall, ceases to belong to the Res. of Offrs., 23rd Jan. 1945.

Maj. C. K. G. Dick, *M.C.* (5882) relinquishes his commn. on account of disability, 13th Mar. 1945.

### TERRITORIAL ARMY.

*March 13.*—War Subs. Maj. R. K. Debenham, *O.B.E.*, *M.D.*, *F.R.C.S.* (89675) to be a Consultant

and is granted the local rank of Brig., 27th Jan. 1945.

### THE ARMY DENTAL CORPS.

*February 9.*—Maj. A. Williams (15720) to be Lt.-Col., 26th Nov. 1944.

*February 13.*—Maj. A. Rhodes (35687) retires on

ret. pay. 10th Feb. 1945, and is granted the hon. rank of Lt.-Col.

### ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.

The work of the Guild proceeds satisfactorily and we get many letters of appreciation from units serving abroad which have received gifts. Parcels are sent every week to the R.A.M.C. personnel in the Forward Areas in B.L.A., Burma and Italy—they include, for all theatres of war, books, games, toilet requisites, football gear in the Corps colours, torches, playing cards, etc.

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men in the Forward Areas. Every Prisoner of War, officers and men of the Corps, in Germany, is sent books and cigarettes and we still have quite a large numbers of "adoptees" to whom we send the quarterly "next-of-kin" parcels.

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P. M. SANDIFORD,  
R.A.M.C. Headquarters Mess, *Hon. Secretary.*  
Millbank,  
London, S.W.1.

### PRISONERS OF WAR.

Temp. Major S. M. Fraser, N.W. Europe  
Temp. Major C. J. Longland, N.W. Europe.

Capt. V. D. R. Martin, N.W. Europe.  
Capt. G. Rigby-Jones, N.W. Europe.

### DEATHS ON ACTIVE SERVICE.

Lt.-Col. M. B. King. Died.  
Major W. Napier. Killed in action.  
Capt. R. A. B. Kinlock. Killed in action.  
Capt. A. M. Ogilvie. Killed in action.  
Capt. J. R. Sweeting. Killed in action.

Capt. A. Robson. Killed in Action.  
Capt. D. J. Burgess. Died.  
Capt. B. R. Cargill. Died.  
Capt. G. A. Richard. Died, accident.

## DEATHS.

**WILLIAMS.**—On Jan. 6, 1945, Major Ernest Montgomery Williams, R.A.M.C., Retired. Born in Murree, India, Oct. 3, 1867, he took the L.R.C.P. London, and the M.R.C.S. England, in 1892, and was commissioned Surgeon Lieutenant July 29, 1893. Promoted Surgeon Captain July 29, 1896, and Major April 29, 1905, he retired July 29, 1913. He held the Retired Pay appointment at Leicester Oct. 7, 1913, to Oct. 17, 1922, and at Topsham from Oct. 18, 1922, till May 25, 1925.

**KING.**—In Italy, the result of an accident, on Feb. 9, 1945, Lieutenant-Colonel Maurice Baylis King, M.C., M.B., R.A.M.C. Born March 15, 1890, he took the M.B. Dublin, in 1915. He was commissioned Lieutenant R.A.M.C.S.R. Aug. 9, 1914. Mobilized Oct. 1, 1915, he was promoted Captain April 1, 1916, and appointed to a Regular Commission June 1, 1918, becoming Captain R.A.M.C. April 1, 1919. He was promoted Major Oct. 1, 1927, and Lieutenant-Colonel April 25, 1942 (April 13, 1942). He was Surgeon to H.E. the Commander-in-Chief in India Oct. 20, 1933, to May 29, 1934. He served in Egypt from Jan. 1, 1916, till March 6, 1916, and in France and Belgium from March 7, 1916, till the end of the war. He was awarded the M.C. and Bar. The Bar for conspicuous gallantry and devotion to

duty in rescuing wounded under very heavy shell fire. His fearlessness set a splendid example to the stretcher bearers, who were then much shaken by the heavy shelling—*London Gazette* July 18, 1917. He also received the British War and Victory Medals. He again saw service in Waziristan 1921-1924 receiving the Medal with Clasp. In the present war he was in France April 17 to June 2, 1940; in North Africa Nov. 9, 1942, till March 15, 1943, and in the Middle East and Central Mediterranean Force April 13, 1943, till the date of his death. A great grandson of Robert John Baylis Burkitt, sometime Assist. Surg., 63 Foot, 36 Foot and 94 Foot.

**GRAHAM.**—In Darlington on 15 Feb., 1945, Major James Herries Graham, M.B., R.A.M.C., Retired. Born May 9, 1879, he took the M.B. Durham, in 1902, and was commissioned Lieutenant R.A.M.C. July 31, 1905. Promoted Captain Jan. 31, 1909, and Major Oct. 15, 1915, he was placed on half-pay Dec. 9, 1917, on account of ill-health contracted on active service and retired for the same, Dec. 9, 1922. He served in France from Aug. 14, 1914, till taken prisoner on Aug. 24, 1915. He was awarded the 1914 Star, British War and Victory Medals.



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# JOURNAL

## OF THE

# ROYAL ARMY MEDICAL CORPS

### Corps News.

APRIL, 1945.

#### EXTRACTS FROM THE "LONDON GAZETTE."

*March 22, 1945.*—The KING has been graciously pleased to give orders for the following promotion in, and appointment to, the MOST EXCELLENT ORDER OF THE BRITISH EMPIRE, in recognition of gallant and distinguished services in field :—

*To be Additional Officer of the Military Division of the said Most Excellent Order:—*

Lieutenant-Colonel (temporary) Henry Walter Featherstone, M.D. (51644), Royal Army Medical Corps.

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North West Europe :—

#### *The Military Cross.*

Major (temporary) Eric George Wilbraham (94979) Royal Army Medical Corps (West Norwood).

Captain John Oldroyd Forfar, M.B. (227049) Royal Army Medical Corps (Broughton Ferry).

Captain Allan George Seymour Hill, M.B. (135094) Royal Army Medical Corps (Edinburgh 11).

#### *The Military Medal.*

No. 7357055 Private Harry Cunningham, Royal Army Medical Corps (Angus).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma :—

#### *The Military Cross.*

Captain Millice Albert Freeman (131391) Army Dental Corps (Cambridge).

#### *The Military Medal.*

No. 7348169 Corporal Alexander Hendry Rollo, Royal Army Medical Corps (Dundee).

No. 7517259 Private Kenneth George Williams, Royal Army Medical Corps (Pontypridd).

*March 22.*—The KING has been graciously pleased to approve that the following be MENTIONED in recognition of gallant and distinguished services in North West Europe :—

Maj.-Gen. Sir Percy S. Tomlinson, K.B.E., C.B., D.S.O., F.R.C.P., K.H.P. (5847) late R.A.M.C.

#### *Royal Army Medical Corps.*

Col. (temp.) D. L. Kerr, T.D., M.B. (30058).

Col. (temp.) W. H. Marston, T.D., M.B. (40137).

Col. (temp.) P. E. D. Pank (5437).

Col. (temp.) J. H. C. Walker, M.B. (8449).

Col. (temp.) R. F. Walker, C.B.E., M.C., M.B. (22118).

Lt.-Col. (temp.) C. W. Arnot, O.B.E., M.C., M.D. (73535).

Lt.-Col. (temp.) C. Bainbridge, M.B. (123118).

Lt.-Col. (temp.) C. E. Gallagher (75661).

Lt.-Col. (temp.) A. F. Kennedy, M.B. (45045).  
Lt.-Col. (temp.) N. J. Logie, M.B., F.R.C.S. (63873).

Lt.-Col. (temp.) T. F. Main, M.D. (167785).

Lt.-Col. (temp.) J. J. Myles, M.B. (50015).

Lt.-Col. (temp.) W. P. Purvis, M.B. (62924).

Lt.-Col. (temp.) J. M. Scott, M.B. (87477).

Lt.-Col. (temp.) J. L. Warner, M.B. (65969).

Lt.-Col. (temp.) F. W. A. Warren (42373).

Lt.-Col. (temp.) G. N. Wood, M.B. (99464).

Lt.-Col. (actg.) R. D. Jones, M.B., F.R.C.S. Edin. (74373).

Lt.-Col. (actg.) G. M. Robertshaw (72162).

Lt.-Col. (actg.) J. Smith (65526).

Maj. C. R. Clayburn, M.B.E., M.B. (92363).

Maj. C. H. Davies, M.D. (75506).

Maj. J. O'Kane, M.B. (92343).

Maj. (temp.) W. G. Bateson, M.B. (67841).

Maj. (temp.) D. E. H. Beattie, M.B. (99325).

Maj. (temp.) R. A. Binning (87261).

Maj. (temp.) J. Clay, M.B. (76026).

Maj. (temp.) H. A. Constable (96991).

Maj. (temp.) D. O. Davies, M.B., F.R.C.S. (241163).

Maj. (temp.) A. S. Dill-Russell, M.B., F.R.C.S. (244206).

Maj. (temp.) W. N. Douglas, M.B. (102597).

Maj. (temp.) R. G. Evans, M.B. (87180).

Maj. (temp.) F. S. Fiddes, M.B. (40070).

Maj. (temp.) T. F. R. Griffin, M.B., F.R.C.S. (127195).

Maj. (temp.) F. M. Hanna, M.B. (103691).

Maj. (temp.) J. Hoile (127041).

Maj. (temp.) D. F. Hutchinson (136427).

Maj. (temp.) W. B. Hynam (127462).

Maj. (temp.) R. N. Lees, M.C., M.B. (112065).

Maj. (temp.) J. B. MacKay, M.B. (69689).

Maj. (temp.) J. Millar, M.B. (106806).

Maj. (temp.) J. A. V. Nicoll (70123).

Maj. (temp.) D. N. Parry (75587).

Maj. (temp.) G. F. Petty (74123).

Maj. (temp.) R. J. Phillips, M.B. (99360).

Maj. (temp.) R. Strang, M.B., F.R.C.S. (239256).

Maj. (temp.) J. M. Tait, M.D. (90919).

Maj. (temp.) A. F. Wallace (88799).

Maj. (temp.) D. J. Watterson, M.D. (135670).

Maj. (temp.) J. W. S. Welborn (136459).

Maj. (temp.) K. S. Wilson, M.B. (131035).

Capt. P. St. G. Anderson, M.B. (266420).

Capt. H. W. C. Baillie, M.B. (123656).

Capt. J. H. Balmer (127186).

Capt. E. S. Bompas (230443).

Capt. (Qr.-Mr.) H. V. Brennan, M.B.E. (244065).

Capt. W. J. Cameron, M.B. (175672).

Capt. A. J. Clarke, M.B. (133358).

Capt. H. Conway, M.B. (216192).

Capt. P. W. M. Davidson, M.B. (211964).

Capt. R. Dobson, M.B. (266547).

Capt. R. C. Droop, M.B. (106789).

Capt. J. O. Forfar, M.B. (227049).  
 Capt. J. G. Gant (244555).  
 Capt. C. N. Gibb, M.B. (252502).  
 Capt. R. D. Glaister, M.B. (252153).  
 Capt. F. I. Herbert, M.B. (150636).  
 Capt. E. K. Hole (102613).  
 Capt. (Qr.-Mr.) W. G. Hyde (127774).  
 Capt. C. G. Irwin, M.B. (225949).  
 Capt. L. P. Lassman, M.B. (115754).  
 Capt. H. J. C. J. L'Etang, B.M. (260685).  
 Capt. A. W. B. Macdonald, M.B. (133958).  
 Capt. B. Maddison (257489).  
 Capt. M. Makin, M.B. (241075).  
 Capt. T. S. Maw, M.B. (250415).  
 Capt. (Qr.-Mr.) J. Maxwell (175543).  
 Capt. L. H. H. May, M.B. (266428).  
 Capt. D. G. McConnell, M.B. (291376).  
 Capt. J. L. McNeill, M.B. (116187).  
 Capt. C. W. Mearns, M.B. (116961).  
 Capt. A. D. Milne (106839).  
 Capt. A. D. Payne, M.B. (246199).  
 Capt. W. Rankin, M.B. (216205).  
 Capt. R. L. Rees (238394).  
 Capt. S. McR. Reid, M.B. (136340).  
 Capt. H. A. Ripman, M.B. (254296).  
 Capt. N. C. Rogers, M.B. (106811).  
 Capt. (Qr.-Mr.) J. E. Serjeant (205865).  
 Capt. G. F. Shaw, M.B. (257934).  
 Capt. G. M. C. Smith, M.B. (125842).  
 Capt. A. U. Somerville (239804).  
 Capt. G. K. Spruell, M.B. (223762).  
 Capt. R. T. Thin, M.B., F.R.C.S. (241080).  
 Capt. I. F. Thomson, M.B. (282478).  
 Capt. C. H. Watts (250337).  
 Capt. H. L. Waugh (268412).  
 Capt. C. F. Young, M.C. (128862).  
 Lt. W. N. Coombes, M.B. (194236).  
 Lt. (Qr.-Mr.) C. R. Crook (248036).  
 Lt. (Qr.-Mr.) C. Evans (225587).  
 Lt. R. A. Green (274233).  
 Lt. J. S. Hayward (305793).  
 Lt. J. A. Hogarth (287578).  
 Lt. R. H. A. Ledgard (287592).  
 7341985 W.O.I G. Baguley.  
 828807 W.O.I W. Bennion.  
 7261957 W.O.I G. M. Green.  
 7258398 W.O.I J. Haslegrave.  
 7255332 W.O.I (actg.) L. C. Tanner.  
 7394739 W.O.II J. Berg.  
 7363028 W.O.II W. S. Fairgrieve.  
 7522651 W.O.II R. W. Fletcher.  
 7347465 W.O.II R. Gower.  
 7522579 W.O.II D. McGhie.  
 7259339 W.O.II J. W. Regardsoe.  
 7372755 S.-Sergt. R. W. Brotherton.  
 6907168 S.-Sergt. E. S. Harcourt.  
 7381393 S.-Sergt. A. M. Holt.  
 7345105 S.-Sergt. J. Mace.  
 7522634 S.-Sergt. J. MacD. Main.  
 7261733 S.-Sergt. W. K. Prevett.  
 7523568 S.-Sergt. D. R. Seymour.  
 7522412 S.-Sergt. R. Skidmore.  
 7263179 S.-Sergt. R. Thomas.  
 1143259 Sergt. R. J. Evans.  
 2056722 Sergt. J. A. Garrett.  
 7522874 Sergt. W. G. Gilson.  
 7344514 Sergt. R. Horsefield.  
 7375754 Sergt. W. U. Jones.  
 7387567 Sergt. E. D. G. Lamb.  
 7357436 Sergt. E. M. Mellor.  
 7344364 Sergt. J. Oag.  
 7376485 Sergt. L. Page.  
 7367289 Sergt. H. F. L. Richards.

7365634 Sergt. R. A. Ridsdale.  
 7357060 Sergt. E. Sandiford.  
 7516719 Sergt. C. Sneddon.  
 7389923 Sergt. A. Sturney.  
 7376963 Sergt. S. McK. Telfer.  
 7360489 Sergt. H. Thornton.  
 7385192 Sergt. G. E. Woolcott.  
 7400840 Cpl. G. S. T. Bailey.  
 7359966 Corpl. B. R. Burley.  
 7349058 Corpl. E. A. T. Bush.  
 6984407 Corpl. J. Fulton.  
 7346272 Corpl. H. Houghton.  
 7516694 Corpl. A. McGregor.  
 14518443 Corpl. W. G. E. Ridley.  
 7405970 Corpl. W. B. Robinson.  
 7384449 Corpl. H. Weber.  
 7369389 Lce.-Corpl. T. Dowson.  
 7360153 Lce.-Corpl. I. Jones.  
 7518924 Lce.-Corpl. F. W. R. Lightfoot.  
 7390038 Lce.-Corpl. E. S. G. Long.  
 7358418 Lce.-Corpl. R. A. Poulter.  
 7374416 Lce.-Corpl. W. C. Vater.  
 7384451 Pt. F. Adams.  
 7370670 Pt. H. Byrne.  
 7364900 Pt. R. W. B. Clark.  
 7399959 Pte. J. E. Coufts.  
 7394520 Pte. R. Dennis.  
 7404185 Pte. L. P. Firth.  
 4913821 Pte. B. J. T. Heston.  
 7367416 Pte. J. J. Jessop.  
 7396879 Pte. T. Lynch.  
 7457711 Pte. W. McLean.  
 7517135 Pte. R. J. Pope.  
 7518692 Pte. P. Sale.  
 7363929 Pte. B. E. Thompson.  
 7388495 Pte. H. Trickett.  
 7374518 Pte. J. Walling.  
 14354730 Pte. T. Walsh.  
 7669011 Pte. H. J. Wolfendon.

#### *Army Dental Corps.*

Capt. J. F. Briscoe (139321).

#### *Queen Alexandra's Imperial Military Nursing Service.*

Miss N. M. Kinsella, S.-Sister (actg.) (208591).  
 Miss D. A. Swinton, S.-Sister (actg.) (209196).  
 Miss H. Wright, S.-Sister (actg.) (206539).  
 Miss M. M. Fearnough, Sister (208081).  
 Miss N. E. Pitts, Sister (209002).  
 Miss K. Rostron, Sister (294519).

#### *Territorial Army Nursing Service.*

Miss M. Besley, A.R.R.C., S.-Sister (temp.) (209820).

Miss A. Haslett, Sister (213436).

*March 22.*—The KING has been graciously pleased to approve that the following be MENTIONED in recognition of gallant and distinguished services in the field :—

#### *Royal Army Medical Corps.*

7378206 Pte. W. Clarke (killed in action).  
 7516809 Pte. T. Scott.

*March 22.*—The KING has been graciously pleased to approve that the following be MENTIONED in recognition of gallant and distinguished services in France, 1940 :—

#### *Royal Army Medical Corps.*

7356619 Cpl. W. Simpson.  
 7349296 Pte. R. J. Haldane.



**March 23.**—The KING has been graciously pleased to give orders for the following appointment to the **MOST EXCELLENT ORDER OF THE BRITISH EMPIRE**, in recognition of gallant conduct in carrying out hazardous work in a very brave manner :—

*To be Additional Member of the Military Division of the said Most Excellent Order :—*

Captain (temporary Major) Ian Affleck. (122053) Royal Army Medical Corps (Franworth, Lancs.).

The KING has been graciously pleased to approve the award of the **GEORGE MEDAL** in recognition of conspicuous gallantry in carrying out hazardous work in a very brave manner, to the undermentioned :—

Sister Miss Sheila Margaret Greaves (206174) Queen Alexandra's Imperial Military Nursing Service (Lincoln).

The KING has been graciously pleased to approve the award of the **BRITISH EMPIRE MEDAL** (Military Division) in recognition of gallant conduct in carrying out hazardous work in a very brave manner, to the undermentioned :—

No. 7347737 Private Arthur Frederick Gibbs, Royal Army Medical Corps (London, S.E.26).

No. 7361559 Private Soichi Teraoka, Royal Army Medical Corps (London, N.W.3).

**March 29.**—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the **MOST EXCELLENT ORDER OF THE BRITISH EMPIRE**, in recognition of gallant and distinguished services in North-West Europe :—

*To be Additional Commander of the Military Division of the said Most Excellent Order :—*

Colonel (temporary) James Melvin, *O.B.E., M.C., T.D.*, M.B. (51561) Royal Army Medical Corps.

*To be Additional Officers of the Military Division of the said Most Excellent Order :—*

Major (temporary Lieutenant-Colonel) Alexander McCorkindale Campbell, *D.S.O.*, M.B. (41791) Royal Army Medical Corps (Glasgow).

Major (temporary Lieutenant-Colonel) Martin Fallon (133536) Royal Army Medical Corps (Dublin).

Major (temporary Lieutenant-Colonel) John Aloysius Finegan (110062) Royal Army Medical Corps (Wigan).

Major (temporary Lieutenant-Colonel) Charles Eddie Gallagher (75661) Royal Army Medical Corps (St. Helens, Stirlingshire).

Major (temporary Lieutenant-Colonel) Robert Lord Holt, M.B., *F.R.C.S.* (87777) Royal Army Medical Corps (Manchester).

Major (temporary Lieutenant-Colonel) Frank Heyward-Jones, *T.D.*, M.B. (38283) Royal Army Medical Corps (Market Weighton).

Major (temporary Lieutenant-Colonel) Harold Whitcomb Everley Jones, M.B. (64925) Royal Army Medical Corps (New Milton).

Major (temporary Lieutenant-Colonel) Alan Francis Kennedy, M.B. (45045) Royal Army Medical Corps (London, W.2).

Major (temporary Lieutenant-Colonel) Frank Leighton Ker (53493) Royal Army Medical Corps (Edinburgh).

Lieutenant-Colonel William James McIntosh, *T.D.*, M.B. (22267) Royal Army Medical Corps (Stafford).

Colonel (temporary) Wilfrid Harvey Marston, *T.D.*, M.B. (40137) Royal Army Medical Corps (Birmingham).

Major (temporary Lieutenant-Colonel) Bruce

Milligan Nicol, M.B. (51433) Royal Army Medical Corps (Bournemouth).

Major (temporary Lieutenant-Colonel) Gavin Ernest Ord, M.B. (103149) Royal Army Medical Corps (Aysgarth, Yorkshire).

Major (temporary Lieutenant-Colonel) Scott Russell Trick, M.B. (66984) Royal Army Medical Corps (Stratford-on-Avon).

Major (acting Lieutenant-Colonel) Donald Herron Young, M.D., *F.R.C.S. Edin.* (65422) Royal Army Medical Corps (Warrington).

*To be Additional Members of the Military Division of the said Most Excellent Order :—*

Captain (temporary Major) Donald Elliot Hamilton Beattie, M.B. (99325) Royal Army Medical Corps (Edinburgh).

No. 7259783 Warrant Officer Class I (Serjeant-Major) Harold Blackburn, Royal Army Medical Corps (Watford).

Captain (temporary Major) Robert Robert Gwyn Evans, M.B. (87180) Royal Army Medical Corps (Chesham).

Captain (Quarter-Master) (temporary Major) Herbert Sydney Hill (92822) Royal Army Medical Corps (Marlborough).

Captain (temporary Major) Matthew Hunter, M.B. (188635) Royal Army Medical Corps (Settle).

Miss Nancie May Kinsella (208591) Sister (acting Senior Sister) Queen Alexandra's Imperial Military Nursing Service (Victoria, Australia).

Captain (temporary Major) John Bruce Mackay (69689) Royal Army Medical Corps (Old Meldrum, Aberdeenshire).

Captain (temporary Major) Angus McLeod, M.B. (89700) Royal Army Medical Corps (Isle of Lewis).

Captain (temporary Major) John Duncan McLennan, M.D. (107958) Royal Army Medical Corps (Milltimber, Aberdeenshire).

Lieutenant (Quarter-Master) Ronald Muir Osborne (250198) Royal Army Medical Corps (Devizes).

Captain (Quarter-Master) George John Potter (171371) Royal Army Medical Corps (Aldershot).

Captain (acting Major) Kenneth Donald Stewart, M.B. (139159) Royal Army Medical Corps (Dublin).

Miss Doris Anne Swinton (209196) Sister, (acting Senior Sister) Queen Alexandra's Imperial Military Nursing Service (Victoria, Australia).

Lieutenant (Quarter-Master) John Tiernan (244779) Royal Army Medical Corps (Aldershot).

Captain (temporary Major) Donald James Watterson (135670) Royal Army Medical Corps (Sutton).

**March 29.**—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North-West Europe :—

#### *The Distinguished Service Order.*

Major (temporary Lieutenant-Colonel) Martin Edward Meakin Herford, *M.B.E., M.C.* (175256) Royal Army Medical Corps (Reading).

#### *The Military Cross.*

Captain Gabriel Karstaedt (97964) Royal Army Medical Corps (Southport).

#### *The Royal Red Cross.*

*To be an Additional Member of the Royal Red Cross, First Class :—*

Miss Gladys Cocking (206065), Sister (acting Matron) Queen Alexandra's Imperial Military Nursing Service (London, S.E.25).

Miss Angela Beatrice Cubitt (213013), Sister (acting Principal Matron) Territorial Army Nursing Service (Cobham).

Miss Mary Leech (213750) Sister (acting Principal Matron) Territorial Army Nursing Service (Colne, Lancashire).

Miss Jessie Elaine Mellor (206309) Sister (acting Principal Matron) Queen Alexandra's Imperial Military Nursing Service (Congleton, Cheshire).

Miss Grace Mary Wallis (206519) Sister (acting Principal Matron) Queen Alexandra's Imperial Military Nursing Service (Birmingham).

*To be an Additional Associate of the Royal Red Cross, Second Class.*

Miss Ethel Theodora Kirby Agate (206604) Sister, Queen Alexandra's Imperial Military Nursing Service (Esher, Surrey).

Miss Eileen Agnes Baldock (206710) Sister (acting Senior Sister) Queen Alexandra's Imperial Military Nursing Service (Shalford, Surrey).

Miss Pamela Mia Bright (209871) Sister, Territorial Army Nursing Service (Freshford, Somerset).

Miss Elizabeth Brown (209811) Sister, Territorial Army Nursing Service (Perth).

Miss Louisa Mary Dipper (206959) Sister (acting Senior Sister) Queen Alexandra's Imperial Military Nursing Service (Coventry).

Miss Hilda Driver (213227) Sister, Territorial Army Nursing Service (Carlisle).

Miss Margaret Isabella Gauld (208236) Sister, Queen Alexandra's Imperial Military Nursing Service (Portsey).

Miss Catherine Mary Keary (208575) Sister (acting Senior Sister) Queen Alexandra's Imperial Military Nursing Service (London, N.W.).

Miss Nora Mary McDonald (208730) Sister, Queen Alexandra's Imperial Military Nursing Service (Canberra, Australia).

Miss Bertha Reynolds (206414) Sister (acting Senior Sister) Queen Alexandra's Imperial Military Nursing Service (London, S.E.27).

Miss Vera Hirst Wainwright (209433) Sister, Queen Alexandra's Imperial Military Nursing Service (Warrington).

Miss Helen Wright (206539) Sister, Queen Alexandra's Imperial Military Nursing Service (Bude, Cornwall).

*April 5.*—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in North West Europe:—

*The Military Cross.*

Captain Andrew James Clarke, M.B. (133358) Royal Army Medical Corps (Edinburgh).

*April 5.*—The KING has been graciously pleased to approve that the following be MENTIONED in recognition of gallant and distinguished services in Burma and on the Eastern Frontier of India:—

Brig. (temp.) G. J. V. Crosby, T.D., M.D. (39045) late R.A.M.C.

Brig. (temp.) H. G. Winter, M.C. (5828) late R.A.M.C.

Col. A. C. Jebb (5670) late R.A.M.C.

Col. (temp.) J. H. Baird, M.B. (5597) (Res. of Off.).

Col. (temp.) J. W. Eames, M.B. (36193).

Col. (temp.) A. J. Gardham, M.S., F.R.C.S. (169467).

Col. (temp.) D. F. Panton (15624).

Col. (actg.) J. R. Dawson (66782).

Col. (actg.) R. V. Franklin, M.B. (34112).

Lt.-Col. (temp.) F. P. M. Anderson, M.B. (35616).

Lt.-Col. (temp.) S. W. K. Arundell (42434).

Lt.-Col. (temp.) N. Bickford (72166).

Lt.-Col. (temp.) S. O. Bramwell, M.B. (73584).

Lt.-Col. (temp.) H. R. Hartnell, M.B.E. (104988).

Lt.-Col. (temp.) A. J. Martin (107960).

Lt.-Col. (temp.) J. H. Moffett, M.D. (131699).

Lt.-Col. (temp.) J. J. O'Dwyer, M.B. (38186).

Lt.-Col. (temp.) M. E. D. Roberts (49517).

Lt.-Col. (temp.) E. J. M. Wenyon, M.B. (104005).

Maj. H. G. N. Cooper, M.B., F.R.C.S. (136369).

Maj. R. H. Wheeler (263458).

Maj. (temp.) J. Brown (128565).

Maj. (temp.) J. V. Crawford, M.B. (133114).

Maj. (temp.) E. A. Donegan, M.B. (74433).

Maj. (temp.) J. Duguid, M.B. (127660).

Maj. (temp.) K. J. Dunlop, M.B. (154905).

Maj. (temp.) J. C. Gregory (141127).

Maj. (temp.) C. L. Hayshunker (104027).

Maj. (temp.) A. Hunter, M.B. (127657).

Maj. (temp.) J. W. Montgomery, M.B. (266417).

Maj. (temp.) W. O'Callaghan (87538).

Maj. (temp.) J. Smibert, M.B. (119764).

Maj. (temp.) B. E. C. Stanley, M.B., F.R.C.S. (119311).

Maj. (temp.) R. K. A. Van Someren, F.R.C.S. (122473).

Capt. N. H. Bloom (133142).

Capt. J. A. Chamberlin, M.B. (104576).

Capt. H. D. Cockburn (246293).

Capt. K. C. S. Edwards (248045).

Capt. H. E. D. Flack (70214).

Capt. C. H. Foggitt, M.B. (216368).

Capt. F. D. Forbes, M.B. (125316).

Capt. A. T. Freeland (191454).

Capt. N. H. H. Golledge (133117).

Capt. A. D. Gould, M.B. (163378).

Capt. J. Griffith, M.B. (188269).

Capt. J. N. Hamill, M.B. (102607).

Capt. E. A. Heaslett (86499).

Capt. T. K. Howatt, M.B. (128380).

Capt. J. S. Mather, M.B. (216688).

Capt. P. G. Miller (150976).

Capt. D. MacD. Milne, M.B. (188965).

Capt. J. C. S. Paterson, M.B. (205065).

Capt. E. Rea, M.B. (225754).

Capt. R. S. Saxton, M.B. (211556).

Capt. J. P. Scrivener (246248).

Capt. J. B. Stafford (178368).

Capt. L. L. Theron (128684).

Capt. W. J. Watt (111799).

Capt. (temp.) (Qr.-Mr.) F. E. Hall (306557).

Capt. (temp.) (Qr.-Mr.) C. P. Knight (205083).

Lt. (Qr.-Mr.) S. Croft (231102).

Lt. E. J. Rubra (248072).

7345877 W.O.I (actg.) E. C. Baines.

2554762 W.O.II W. Tompkins.

7261569 S.-Sergt. J. G. Heaton.

2210776 S.-Sergt. R. Melvin.

7358100 S.-Sergt. G. S. Morgan.

73467383 S.-Sergt. R. McP. Paterson.

7369761 S.-Sergt. (actg.) G. T. Carter.

6105602 Sergt. R. H. Cook.

7381952 Sergt. S. A. Cross.

7348804 Sergt. L. H. Field.

7264936 Sergt. T. Hawkins.

7523302 Sergt. I. Morgan.

7266271 Sergt. W. Myerscough.

7383458 Sergt. R. G. Richmond.

7386426 Sergt. (actg.) G. W. Agnew.

7368369 Sergt. (actg.) J. L. Heelas.

7362637 Sergt. (actg.) J. E. Jones.

7401132 Sergt. (actg.) D. B. Thomas.

7357291 Lce.-Sergt. A. Clark.

7390612 Corpl. S. T. Goddard.

950177 Corpl. T. H. Neat.  
 7357064 Corpl. E. Walls.  
 14229843 Corpl. (actg.) J. T. Berkshire.  
 7358772 Corpl. (actg.) W. Harris.  
 7368111 Lce.-Corpl. R. Ellis.  
 7534316 Lce.-Corpl. G. W. Halge.  
 7346985 Lce.-Corpl. J. R. Howson.  
 7349982 Lce.-Corpl. R. King.  
 2574035 Lce.-Corpl. F. P. Northey.  
 7399004 Lce.-Corpl. H. Sheffield.  
 7525085 Pte. E. Dover.  
 7534223 Pte. N. L. Gray.  
 7369897 Pte. K. Kershaw.  
 7377463 Pte. J. P. O'Reardon.  
 7382051 Pte. C. G. Poole.

April 10.—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the MOST EXCELLENT ORDER OF THE BRITISH EMPIRE, in recognition of Meritorious Services :—

To be Additional Officers of the Military Division of the said Most Excellent Order :—

Lieutenant-Colonel (temporary Colonel) Sidney John Liddon Lindeman, M.C. (15660) Royal Army Medical Corps.

Lieutenant-Colonel (temporary Colonel) James Rannie, T.D., M.D. (35773) Royal Army Medical Corps, Territorial Army.

To be Additional Members of the Military Division of the said Most Excellent Order :—

Captain (temporary Major) James William Campbell, M.B. (90336) Royal Army Medical Corps, Territorial Army.

Captain Miss Marguerite Eleanor Mary Day (279096) Royal Army Medical Corps.

Major (temporary Lieutenant-Colonel) Thomas Neville Hart (75663) Royal Army Medical Corps, Territorial Army.

April 12.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North West Europe :—

#### *The Military Cross.*

Captain Robert McIlwraith (234462) Royal Army Medical Corps (Falkirk).

Captain John Alexander Tulloch (291123) Royal Army Medical Corps (Forres).

Lieutenant Stanley Walter Pleasants (287598) Royal Army Medical Corps (Hull).

Lieutenant David Train (282018) Royal Army Medical Corps (Orpington).

#### *The Military Medal.*

No. 7360233 Corporal Charles Bryan, Royal Army Medical Corps (Belfast).

No. 7395981 Lance-Corporal Jack Day, Royal Army Medical Corps (Warrington).

No. 7369255 Private John Swinton Dunbar, Royal Army Medical Corps (Edinburgh).

No. 7376984 Private James Hislop, Royal Army Medical Corps (Wishaw).

No. 7345225 Private Herbert Porteous Wilson, Royal Army Medical Corps (Edinburgh).

April 12.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Italy :—

#### *The Military Cross.*

Major (temporary) Patrick Charles Mitchell, M.B. (63705) Royal Army Medical Corps (Oxford).

April 12.—The KING has been pleased to grant unrestricted permission for the wearing of the following decorations which have been conferred on

the undermentioned officers in recognition of distinguished services in the cause of the Allies :—

*Decoration Conferred by the President of the United States of America.*

#### *Soldier's Medal.*

Captain James McLean (133494) Royal Army Medical Corps.

*Nepalese Decoration Conferred by General His Highness Maharajah Sir Goodha Shumshere Jung Bahadur Rana.*

*The Order of the Star of Nepal, IV Class.*

Captain Barnett Freedman (159668) Royal Army Medical Corps (since died).

April 12.—The KING has been graciously pleased to confer "The Efficiency Decoration" upon the following officers of the Territorial Army :—

#### *Royal Army Medical Corps.*

Lt.-Col. (T/Col.) A. O. Bekenn, O.B.E. (32597) (T.A.R.O.).

Maj. (T/Lt.-Col.) G. A. Kane (52436).

Maj. (T/Lt.-Col.) C. F. Mayne, O.B.E. (37591).

Maj. (T/Lt.-Col.) J. E. Morrison (58462).

Maj. (T/Lt.-Col.) W. Morrison, M.C. (38322).

Maj. L. J. Beynon (49700).

Maj. E. S. Kirkhouse (41953).

Maj. G. B. Matthews (41980).

Capt. N. W. Kidston (51111).

#### *The Army Dental Corps.*

Capt. G. A. Lawson-Brown (41357) (T.A.R.O.).

March 20.—Maj. C. King, M.B. (55948) is placed on the h.p. list on account of disability, 18th Mar. to 15th Apr. 1945 incl.

March 27.—The Notifn. regarding Lt.-Col. M. B. King, M.C., M.B. (10752) in *Gazette* (Supplement) dated 16th Mar. 1945 is cancelled.

Maj. R. V. Franklin, M.D. (34112), to be Lt.-Col. 13th Mar. 1945.

April 6.—Lt.-Col. G. D. Yates, M.B. (27679) having attained the age for retirement, is retained on the active list (supern.) 5th Apr. 1945.

Lt.-Col. L. M. Rowlette, D.S.O., M.C. (15764) having attained the age for retirement, is retained on the active list (supern.) 6th Apr. 1945.

Maj. (War Subs. Lt.-Col.) P. F. Palmer, M.B. (35621) to be Lt.-Col., 5th Apr. 1945.

Maj. (War Subs. Lt.-Col.) D. Bluett, O.B.E., M.B. (35617) to be Lt.-Col. 6th Apr. 1945.

April 10.—Col. W. E. Tyndall, C.B.E., M.C., M.B. (24193) late R.A.M.C., is granted the Local rank of Maj.-Gen., 20th Mar. 1945.

The promotion of the undermentioned Majs. is antedated as follows :—

R. A. Bennett, M.D., M.R.C.P. (Edin.) (31401) to 10th Feb. 1945.

W. A. D. Drummond (31405) to 15th Feb. 1945.

J. G. E. Vachell (31444) to 19th Feb. 1945.

J. T. Smyth, M.B. (34539) to 1st Mar. 1945.

(War Subs. Lt.-Col.) G. Anderton, M.B. (36781) to 4th Mar. 1945.

R. J. G. Hyde, M.B. (34113) to 8th Mar. 1945.

R. V. Franklin, M.D. (34112) to 13th Mar. 1945.

#### *Regular Army Reserve of Officers.*

April 3.—Maj. T. J. Hallinan, O.B.E., M.B. (5492), having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., 17th Jan. 1945.

April 10.—Col. (hon. Brig.) J. S. McCombe, D.S.O., M.B. (4328) late R.A.M.C., having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., 9th Apr. 1945.

# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

## Corps News.

MAY, 1945.

### EXTRACTS FROM THE "LONDON GAZETTE."

*April 19, 1945.*—The KING has been graciously pleased to give orders for the following promotions in, and appointments to, the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Italy :—

*To be Additional Officers of the Military Division of the said Most Excellent Order :—*

Lieutenant-Colonel (temporary) Francis Vernon Allen, M.B. (64147), Royal Army Medical Corps (Scarborough).

Colonel (temporary) James Craw Barnetson, M.B. (41955) Royal Army Medical Corps (Edinburgh).

Lieutenant-Colonel (temporary) Herbert Alfred Brittain, M.B., F.R.C.S. (195579) Royal Army Medical Corps (Northampton).

Lieutenant-Colonel (temporary) Arthur Charlton Cox (65321) Royal Army Medical Corps (Aberdare).

Lieutenant-Colonel (temporary) Donald Macdonald Lyon, M.B. (115201) Royal Army Medical Corps (Hove).

Lieutenant-Colonel (temporary) Henry Osborne MacCabe Merewether, M.B., F.R.C.S. (133959) Royal Army Medical Corps (Huntly).

Lieutenant-Colonel (temporary) Laurence Henry Murray, M.D. (98910) Royal Army Medical Corps (Kenton Bank Foot).

Colonel (temporary) Phillip Francis Palmer, M.B. (35621) Royal Army Medical Corps (Hatfield).

Lieutenant-Colonel (temporary) Richard Vincent Phillipson (65499) Royal Army Medical Corps (Fleet, Hants).

Lieutenant-Colonel (temporary) Joseph Clynton Reed, M.B. (56276) Royal Army Medical Corps.

Lieutenant-Colonel (acting) Norman Graham Guy Talbot, M.B. (86207) Royal Army Medical Corps (Donnington).

Lieutenant-Colonel (temporary) Wilfred Henry Valentine, M.B. (66452) Royal Army Medical Corps (Harborne).

Colonel (temporary) George Alexander Walmsley, M.B. (36788) Royal Army Medical Corps (Dublin).

Major (temporary) Thomas Herbert Howarth Wilson (70943) The Army Dental Corps (Maidenhead).

Lieutenant-Colonel (temporary) Gordon Ethelbert Ward Wolstenholme (119645) Royal Army Medical Corps (Sandsend).

*To be Additional Members of the Military Division of the said Most Excellent Order :—*

Major (temporary) Richard John Vulliamy Battle, F.R.C.S. (65564) Royal Army Medical Corps.

Major (temporary) Robert Cox, M.B., F.R.C.S. (98946) Royal Army Medical Corps.

Captain Robert Meffan Fisher (150136) The Army Dental Corps (Spennymoor).

Major (temporary) Sydney Wallace Jefcoate Harbutt, M.B., F.R.C.S. (133955) Royal Army Medical Corps.

Major (temporary) William Arran Heggie, M.C., M.B. (96612) Royal Army Medical Corps (Carnshalton).

Captain Dewi Heulini Jones (133129) Royal Army Medical Corps (Hengoed, Glam.).

Major (temporary) Raymond Alexander King, M.B. (112384) Royal Army Medical Corps (London, S.W.7).

Captain Duncan Macdonald, M.B. (236134) Royal Army Medical Corps (Clarkston).

Major (temporary) Charles Sidney Pope (123413) Royal Army Medical Corps (Preston).

Major (temporary) Herbert Brenton Porteous, M.D. (88270) Royal Army Medical Corps (Moffat).

Captain John Noel Usher Russell, M.B. (127287) Royal Army Medical Corps (Co. Donegal).

Major (temporary) Raymond Denys Rutherford (111786) Royal Army Medical Corps (Hove).

Lieutenant (Quarter-Master) Hubert Alfred Stephens (178567) Royal Army Medical Corps (Cheltenham).

Major (temporary) Miss Barbara Bartlett Stimson (225015) Royal Army Medical Corps.

Captain Michael Guy Sutton, M.B. (211784) Royal Army Medical Corps (Cheltenham).

No. 7378821 Warrant Officer Class II Frank Gordon Tucker, Royal Army Medical Corps (London, S.W.19).

*April 19.*—The KING has been graciously pleased to approve the award of the British Empire Medal (Military Division), in recognition of gallant and distinguished services in Italy, to the undermentioned :—

No. 7391906 Staff-Sergeant (acting) Haydon Richard Carter, Royal Army Medical Corps (Bargoed).

No. 7251258 Private Cyril Othneil Joseph Chambers, Royal Army Medical Corps (Falkingham, Lincs.).

No. 3245321 Warrant Officer Class II (acting) Robert Leggate Kirkland, Royal Army Medical Corps (Oxford).

No. 7360727 Staff-Sergeant Joseph Edwin Mitcham, Royal Army Medical Corps (Sudbury, Suffolk).

No. 7260554 Warrant Officer Class I (acting) William Frederick Swinnerton, Royal Army Medical Corps (London, S.W.15).

No. 7521615 Sergeant Clifford Stanley Wilson, Royal Army Medical Corps (Belmont, Surrey).

*April 19.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

*The Military Cross.*

Captain John Thomas Allan Essex, M.B. (216358), Royal Army Medical Corps (Quinton, Birmingham 32).

Captain John Kinnear Mackay, M.B. (119599) Royal Army Medical Corps (Aboyne).

Captain Donald Cameron Watson, M.B. (252474) Royal Army Medical Corps (Runcorn).

*The Royal Red Cross.*

*To be an Additional Member of the Royal Red Cross, First Class.*

Miss Marjorie Birdsall, A.R.R.C. (206033) Sister (acting Senior Sister) Queen Alexandra's Imperial Military Nursing Service (Skipton in Craven, Yorks.).

Miss Doreen Wilhemina Douglas (206121), Sister (acting Matron) Queen Alexandra's Imperial Military Nursing Service (Dumfries).

Miss Enid Madeline Kinnersly Taylor (206475) Matron (acting Principal Matron) Queen Alexandra's Imperial Military Nursing Service (Needham Market).

*To be an Additional Associate of the Royal Red Cross, Second Class.*

Miss Isabel Doris Hounsham (213486), Sister, Territorial Army Nursing Service (Banstead).

Miss Mary Mackenzie (236449), Sister, Queen Alexandra's Imperial Military Nursing Service.

Miss Grace Emmeline Thompson (206492), Sister, Queen Alexandra's Imperial Military Nursing Service (Horsham).

Miss Kathleen Wilgress Walker (252874), Sister, Queen Alexandra's Imperial Military Nursing Service (Godalming).

*April 19.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma :—

*The Military Cross.*

Captain John Joseph Yelverton Dawson, M.B. (230351), Royal Army Medical Corps (Nottingham).

Captain John Maxwell Hamilton (236357), Royal Army Medical Corps (Glasgow, W.2).

*April 26.*—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition of gallant and distinguished services in Burma :—

*To be Additional Members of the Military Division of the said Most Excellent Order :—*

Captain Matthew Marshall Campbell, M.B. (250651) Royal Army Medical Corps (Alexandria, Scotland).

Major (temporary) John Jacob Elbert, M.B. (131323) Royal Army Medical Corps (Rothesay).

*April 26.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma :—

*The Military Cross.*

Captain John Stanley I'Anson Chesshire, M.B. (150248) Royal Army Medical Corps (Wolverley).

Captain Robert Alastair Boys Kinloch (223547) Royal Army Medical Corps (attached Indian Army) (St. Albans).

Captain Oliver Parry Llewellyn (133678) Royal Army Medical Corps (London, S.W.17).

Captain Theophilus Crowhurst Thorne (153829) Royal Army Medical Corps (Saffron Walden).

The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in Burma :—

*Royal Army Medical Corps.*

Maj. P. Baker, M.B. (106784).

Maj. (temp.) G. A. S. Akeroyd (163694).

Maj. (temp.) J. Donaldson, M.B. (191097).

Maj. (temp.) J. W. N. Duerden, M.B. (99461).

Maj. (temp.) C. R. Houghton, M.B.E. (127197).

Maj. (temp.) J. S. McCrae, M.B. (199332).

Capt. O. C. Colt, M.B. (76063).

Capt. D. W. Evans (248710).

Capt. P. Firstenberg (128983).

Capt. H. A. Gibb, M.B. (110065).

Capt. L. C. L. Gonet, M.B. (163385).

Capt. E. J. Harrison, M.B. (254103).

Capt. D. C. Langwell, M.B. (96817).

Capt. F. Luckett, M.B. (169585).

Capt. J. R. McGregor, M.B. (173436).

Capt. P. M. M. Pritchard, M.B. (252437).

Capt. T. B. L. Roberts (248197) (Att'd 9 Gurkha Rif.).

Capt. J. R. D. Williams (152659).

Capt. (temp.) T. A. Taylor, M.B. (171197).

7358127 Sergt. C. Callard.

7357649 Sergt. A. Edwards.

7370963 Sergt. F. Heighway.

7370916 Sergt. S. F. Jevons.

7518346 Sergt. L. W. Smith.

7372381 Sergt. L. Stanley.

7372391 Sergt. A. Watkinson.

7264652 Sergt. G. H. Wood.

7525028 Lce.-Corpl. D. Peters.

7377126 Pte. F. Kelleher.

7371093 Pte. R. Neilson.

*Queen Alexandra's Imperial Military Nursing Service.*

Miss A. McGearey, M.B.E., A.R.R.C. Matron (actg.) (206315).

*April 26.*—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Italy :—

*The Military Cross.*

Captain Joseph Patrick John Burns, M.B. (257283) Royal Army Medical Corps (Belfast).

Captain Walter Farrant Caldwell, M.B. (236398) Royal Army Medical Corps (Glasgow, W.4).

Captain John Basil Jayne (246330) Royal Army Medical Corps.

Captain John William Langley Kemp, M.B. (120184) Royal Army Medical Corps (Horsham).

Captain Lewis Macdonald Reid, M.B. (136639) Royal Army Medical Corps (Ayr).

*May 3.*—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in North-West Europe :—

*The Military Cross.*

Captain John Derbyshire Fisher (250628) Royal Army Medical Corps (Radcliffe-on-Trent).

May 10.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North-West Europe :—

*The Military Cross.*

Captain Hector Ian Campbell MacLean, M.B. (89651) Royal Army Medical Corps (Hawick).

Captain Christopher Hugh Watts (250337) Royal Army Medical Corps (Purley).

May 10.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished service in the field :—

*The Military Cross.*

Captain Clive Henry Kirkpatrick Daly (246250) Royal Army Medical Corps.

May 10.—The KING has been graciously pleased to approve that the following be Mentioned in recognition of gallant and distinguished services in North-West Europe :—

Brig. (temp.) H. L. Garson, *O.B.E., M.C., T.D.*, M.B. (21427).

Brig. (actg.) R. H. Lucas, *C.B.E., M.C.*, F.R.C.S. Edin. (15675).

Col. (temp.) B. J. Daunt, *O.B.E.* (14794).

Lt.-Col. (temp.) J. C. Anderson, M.B., F.R.C.S. (52359).

Lt.-Col. (temp.) K. H. Clark, M.B. (63256).

Lt.-Col. (temp.) M. de Lacy, *T.D.*, M.B. (41583).

Lt.-Col. (temp.) A. W. Gardner (84616).

Lt.-Col. (temp.) J. A. D. Johnston, *M.C.*, M.B. (63802).

Lt.-Col. (temp.) H. B. Lee (63105).

Lt.-Col. (temp.) W. R. Logan, *T.D.* (40634).

Lt.-Col. (temp.) H. Sissons (62813).

Maj. (temp.) I. Aubrey, *M.C.* (34058).

Maj. (temp.) A. W. Box, M.B. (75649).

Maj. (temp.) D. A. G. Brown (112610).

Maj. (temp.) T. J. Brownlee, M.B., F.R.C.S. (122719).

Maj. (temp.) J. A. Elliot, M.D., F.R.C.S. (221830).

Maj. (temp.) E. E. Evans (90069).

Maj. (temp.) M. C. Fulton, *M.C.* (110063).

Maj. (temp.) I. C. Gilliland, M.B. (106791).

Maj. (temp.) J. M. Henderson, M.B. (85039).

Maj. (temp.) S. T. Henderson, M.B. (128660).

Maj. (temp.) (Qr.-Mr.) S. A. Keeping (122290).

Maj. (temp.) J. Kerr, M.B. (34186).

Maj. (temp.) J. M. Leggate, M.B., F.R.C.S. (270922).

Maj. (temp.) W. R. McCrae, M.B. (135391).

Maj. (temp.) W. Michie, M.B., F.R.C.S. (97131).

Maj. (temp.) R. O. G. Norman, M.B. (89588).

Maj. (temp.) I. D. Paterson, M.B. (99318).

Maj. (temp.) G. F. Petty (74123).

Maj. (temp.) S. F. Raistrick (133208).

Maj. (temp.) N. L. Russell (85473).

Maj. (temp.) (Qr.-Mr.) A. Sills (127102).

Maj. (temp.) L. B. Wevill, M.B., F.R.C.S. (106327).

Maj. (temp.) E. G. Wilbraham, *M.C.* (94979).

Capt. I. H. Baum, M.B. (106383).

Capt. C. J. Champ, M.B. (246247).

Capt. J. Clark, M.B. (231989).

Capt. F. W. Dickson, M.B. (103688).

Capt. J. P. Gannon, M.B. (246755).

Capt. H. L. Gardner, M.B. (216195).

Capt. T. Gass, M.B. (188941).

Capt. E. G. Hardy, M.B. (159529).

Capt. G. F. Houston (173438).

Capt. (Qr.-Mr.) S. Howe (125431).

Capt. R. T. Kiddie, M.B. (175905).

Capt. K. Misch (301679).

Capt. A. B. Robertson, M.D. (257289).

Capt. T. H. Sansome, M.B. (30114).

Capt. G. D. Scarrow, M.D. (225934).

Capt. A. Young, M.B. (185099).

Lt. (Qr.-Mr.) T. H. Burnett (171369).

Lt.-R. A. Condie (287576).

Lt. (Qr.-Mr.) D. Moncur (252795).

Lt. E. J. Rogers (268395).

Lt. (Qr.-Mr.) J. Stroud (231103).

2871132 W.O.I. D. G. King.

7336956 W.O.I. D. E. Quaintance.

7265162 W.O.II. V. T. G. Wood.

6845778 S.-Sergt. K. J. Burton.

7361964 S.-Sergt. G. Collinson.

7346699 S.-Sergt. H. Lennox.

7248042 S.-Sergt. H. Mason.

7386391 S.-Sergt. (actg.) R. Rutherford.

7523953 Sergt. D. Edwards.

7264856 Sergt. W. Hayden.

7377399 Sergt. N. J. Pettifor.

7379603 Sergt. E. H. C. Wadhams.

7362504 Sergt. (actg.) J. Thorpe.

7385089 Corpl. K. E. Adams.

7348118 Corpl. H. Carabine.

7381430 Corpl. W. L. Cranna.

7374398 Corpl. J. E. Evans.

3191158 Corpl. W. C. Greenshields.

14593344 Corpl. F. G. Madgwick.

7377474 Corpl. F. G. Roberts.

7366805 Corpl. R. Simpson.

7375273 Corpl. R. Soper.

7378805 Corpl. S. L. Squires.

7394420 Lce.-Corpl. C. R. Wordingham.

7399959 Pte. J. E. Coutts.

7522540 Pte. R. F. J. Gisby.

7370302 Pte. M. McLeod.

7385278 Pte. C. L. Morris.

7343162 Pte. L. Pipes.

7264527 Pte. L. A. Pyke.

7366202 Pte. J. Wallace.

*Army Dental Corps.*

Lt.-Col. (temp.) E. C. Browne, B.D.S. (41576).

Capt. J. F. Briscoe (139321).

Capt. B. G. Wood (135616).

7536875 Corpl. W. Simpson.

*Queen Alexandra's Imperial Military Nursing Service.*

Miss M. Hobbs, Principal Matron (actg.) (206183).

Miss F. M. Percival, R.R.C. Principal Matron (actg.) (206380).

Miss M. J. Anglin, S.-Sister (206558).

Miss B. P. G. Watkins, Sister (215918).

Miss K. Crago, A.R.R.C., Sister (206870).

Mrs. N. Thornley, Sister (209967).

April 17.—Maj. J. F. W. Meenan, M.B. (8127) retires on ret. pay, on account of disability, 18th Apr. 1945, and is granted the hon. rank of Lt.-Col.

April 20.—The undermentioned offrs. holding Short Service Comms. are apptd. to permanent comms. retaining their present seniority :—

Capt. J. B. Neal (47440), 24th Aug. 1944.

Capt. E. G. Wright, M.B. (87017), 24th Aug. 1944.

Capt. R. L. Marks, M.B. (89376), 24th Aug. 1944.

Capt. J. B. Evans (85176), 25th Aug. 1944.

Capt. H. M. Rice, M.B. (85929), 1st Sept. 1944.

Capt. C. E. Stuart, M.B. (92426), 1st Sept. 1944.

- Capt. P. H. Shorthouse (86846), 1st Sept. 1944.  
 Capt. M. M. Lewis, M.B. (87791), 1st Sept. 1944.  
 Capt. P. C. Mitchell, M.B. (63705), 2nd Sept. 1944.  
 Capt. R. M. Johnstone, M.B. (56428), 2nd Sept. 1944.  
 Capt. T. P. H. McKelvey, M.B. (88473), 2nd Sept. 1944.  
 Capt. W. R. W. West-Watson, M.B. (89803), 4th Sept. 1944.  
 Capt. J. M. Matheson, M.B. (69803), 15th Sept. 1944.  
 Capt. H. R. Miller (104605), 15th Sept. 1944.  
 Capt. J. W. Spence, M.B. (102683), 23rd Sept. 1944.  
 Capt. S. Boan, M.B. (98369), 23rd Sept. 1944.  
 Capt. W. M. Owen, M.B. (101992), 25th Sept. 1944.  
 Capt. G. L. Ritchie, M.B. (107964), 28th Sept. 1944.  
 Capt. J. N. Hamill, M.B. (102607), 29th Sept. 1944.  
 Capt. C. Reburn (92604), 30th Sept. 1944.  
 Capt. R. K. Pilcher (100999), 4th Oct. 1944.  
 Capt. H. Pozner (101000), 4th Oct. 1944.  
 Capt. G. F. Anderson, M.B. (107665), 10th Oct. 1944.  
 Capt. R. H. Baird, M.B. (100954), 12th Oct. 1944.  
 Capt. H. R. Hartnell (104998), 17th Oct. 1944.  
 Capt. H. W. Whitchee, M.B. (65389), 20th Oct. 1944.  
 Capt. A. C. S. Hobson (106830), 23rd Oct. 1944.  
 Capt. J. G. S. Holman (106831), 23rd Oct. 1944.  
 Capt. S. J. Hepworth, M.B. (100963), 31st Oct. 1944.  
 Capt. L. Griffiths (107763), 4th Nov. 1944.  
 Capt. C. F. Murison, M.B. (100997), 7th Nov. 1944.  
 Capt. R. I. Mitchell, M.B. (70600), 10th Nov. 1944.  
 Capt. D. B. Seymour-Price (127775), 16th Nov. 1944.  
 Capt. R. J. Gray, M.B. (112038), 20th Nov. 1944.  
 Capt. S. Mackenzie (111761), 23rd Nov. 1944.  
 Capt. H. G. Skinner, M.B. (111584), 29th Nov. 1944.  
 Capt. J. P. Baird, M.B. (115469), 12th Dec. 1944.  
 Capt. T. A. Groves, M.B. (115171), 29th Dec. 1944.  
 Capt. E. L. O. Hood, M.B. (115984), 9th Jan. 1945.  
 Capt. S. M. P. Conway (127184), 11th Mar. 1945.  
*April 27.*—Col. S. Arnott, *C.B.E., D.S.O., M.D.* (4215) late R.A.M.C., is granted the local rank of Maj.-Gen., 31st Mar. 1945.  
 The undermentioned Capt. to be Maj. :—  
 23rd Apr. 1945 :—  
 R. J. G. Morrison, M.D. (67302).  
 (War Subs. Maj.) J. W. Orr, *M.C.*, M.B. (67847).  
 24th Apr. 1945 :—  
 (War Subs. Maj.) J. A. MacDougall, M.D. (68237).  
 25th Apr. 1945 :—  
 (War Subs. Maj.) A. C. Cox, M.B. (65321).  
 (War Subs. Maj.) A. Gleave, M.B. (65314).  
 D. S. Cochran, M.B. (65307).  
 A. M. Pugh, M.B. (65319).  
 (War Subs. Maj.) J. H. Taylor, M.B. (57334).  
 (War Subs. Maj.) D. Wright, M.B. (65320).  
 (War Subs. Maj.) G. C. Dansey-Browning (65323).  
*May 1.*—Maj.-Gen. O. Ievers, *C.B., D.S.O., M.B.* (5978) ret. pay, is appointed Col. Comdt., 27th Mar. 1945, vice Maj.-Gen. W. H. S. Nickerson, *F.C., C.B., C.M.G.*, M.B., ret. pay, who has attained the age limit for the appt.  
*May 4.*—Maj.-Gen. A. B. Abstin (15744) late A.D. Corps, is apptd. Hon. Dental Surgeon to The King, 17th Apr. 1945.  
*May 8.*—Col. (actg. Maj.-Gen.) J. C. A. Dowse, *C.B.E., M.C.*, M.B. (8626) late R.A.M.C. to be temp. Maj.-Gen., 8th May, 1945.  
 Col. (local Maj.-Gen.) W. E. Tyndall, *C.B.E., M.C.*, M.B. (24193) late R.A.M.C. to be a D.M.S. and is granted the actg. rank of Maj.-Gen., 7th Apr. 1945.

## DEATHS ON ACTIVE SERVICE.

- Capt. (Qr.-Mr.) A. D. Vokes. Died.  
 Capt. J. H. Joseph. Killed in action.  
 Capt. C. W. O'Donoghue. Died.  
 Capt. B. A. McM. Brown. Died.  
 Capt. P. H. Barkey. Killed in action.  
 Lt.-Col. W. Simpson. Died.  
 Capt. J. H. R. Barker. Died.  
 Capt. (Miss) C. M. Edmonds. Died, accident.  
 Capt. B. Sidman. Killed in action.  
 Capt. G. S. Sheill. Died of wounds.  
 Capt. P. J. O'Flynn. Killed in action.

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# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

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## Corps News.

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JUNE, 1945.

### EXTRACTS FROM THE "LONDON GAZETTE."

May 24, 1945.—The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in North-West Europe :—

#### *The Distinguished Service Order.*

Colonel (acting) Graeme Mathew Warrack (57723), Royal Army Medical Corps (Edinburgh).

#### *The Military Cross.*

Captain (temporary) Bryan Chase Montague (287224), Royal Army Medical Corps (Christchurch).

The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in Italy :—

#### *The Military Cross.*

Captain Hubert Archibald Cole, M.B. (128227), Royal Army Medical Corps (Rotherham).

The KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in Burma :—

#### *The Military Cross.*

Captain Arthur Cyril Vernon Jones (202346), Royal Army Medical Corps (Wolverhampton).

Captain Edgeworth Horace Williams, M.B. (136806), Royal Army Medical Corps (Carmarthen).

June 7.—The KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in North-West Europe :—

#### *The Distinguished Service Order.*

Lieutenant-Colonel (temporary) Norman James Patrick Hewlings (114840), Royal Army Medical Corps (Banbury).

May 15.—Lt.-Col. E. G. S. Cane, D.S.O., M.B. (3025) ceases to be employed on account of disability, 12th May 1945, and is restored to the rank of Col.

May 18.—Col. G. F. Allison, C.B.E., M.C. (4856) late R.A.M.C., retires on ret. pay on account of disability, 2nd May 1945, and is granted the hon. rank of Brig.

#### *Short Service Comms.*

War Subs. Maj. John Duguid, M.B. (127660), from Emerg. Commn., is granted a Short Service Commn. in the rank of Lt., 1st Apr. 1940, and to be Capt., 1st Apr. 1941, with seniority next below Capt. J. N. Threlfall.

War Subs. Capt. Alexander Grieve, M.B. (173447), from Emerg. Commn., is granted a Short Service Commn. in the rank of Lt., 21st Feb. 1941, and to be Capt., 21st Feb. 1942.

War Subs. Capt. Donald Emile Solomon Steele (223764), from Emerg. Commn., is granted a Short Service Commn. in the rank of Lt., 31st Jan. 1942, and to be Capt., 31st Jan. 1943.

War Subs. Capt. Ian Nance Darbyshire, M.B. (266423), from Emerg. Commn., is granted a Short Service Commn. in the rank of Lt., 13th Mar. 1943, and to be Capt., 13th Mar. 1944.

May 25.—Col. J. G. Gill, C.B.E., D.S.O., M.C., M.B. (8368) late R.A.M.C., having completed four years in the rank is retained on the Active List (supern.), 22nd May 1945.

Lt.-Col. F. Harris, C.B.E., M.C., M.B. (15707), from R.A.M.C., to be Col., 22nd May 1945, with seniority from 1st Jan. 1942.

Lt.-Col. J. T. McConkey (15652) having attained the age for retirement, is retained on the Active List supern., 30th May 1945.

Maj. (War Subs. Lt.-Col.) C. E. Eccles, O.B.E. (35619) to be Lt.-Col., 22nd May 1945.

May 29.—Maj. F. McL. Richardson, D.S.O., M.D. (36784) to be Lt.-Col., 30th May 1945.

#### *Short Service Comms.*

Capt. A. Crook (78704) is granted a permanent commn. retaining his present seniority, 1st Nov. 1943.

War Subs. Capt. Frederick Lanceley, M.B. (157735), from R.A.M.C. (Emerg. Commn.) is granted a Short Service Commn. in the rank of Lt., 20th Nov. 1940, and to be Capt., 20th Nov. 1941, with seniority next below Capt. A. J. Fulthorpe.

June 1.—Capt. J. P. Weir, M.B. (65325), to be Maj., 30th Apr. 1945.

#### *Short Service Commn.*

Patrick Arthur Terence Wood, M.B. (345308), to be Lt., 5th May 1945.

War Subs. Maj. J. C. Hawksley, M.D., F.R.C.P. (115478), R.A.M.C., to be a Consultant, and is granted the local rank of Brig., 22nd Apr. 1945.

June 5.—The medical qualifications of Capt. (War Subs. Maj.) J. M. Matheson, M.D., M.R.C.P. Edin. (69803), are as now described and not as notified in *Gazette* (Supplement) dated 20th Apr. 1945.

Maj. (War Subs. Lt.-Col.) J. W. Eames, M.B. (36193) to be Lt.-Col., 5th June 1945.

Lt.-Col. W. D. Newland, *M.C.* (14373), having attained the age for retirement, is retained on the active list supern., 5th June 1945.

*Short Service Commn.*

War Subs. Maj. L. E. C. Davies, *M.B.E.*, *M.B.* (96670), to be a Consultant, and is granted the local rank of Brig., 10th Apr. 1945.

June 8.—Maj. A. Hendry, *M.B.* (10763) ceases to be re-employed on account of disability, 6th June 1945 and is restored to the rank of Lt.-Col.

*Short Service Commn.*

Lt. (War Subs. Capt.) Alexander Maclaurin Buchanan, *M.B.* (133635) from Emerg. Commn., is granted a Short Service Commn. in the rank of

Lt., 2nd June 1940, and to be Capt., 2nd June 1941 with seniority next below Capt. G. R. Marshall.

War Subs. Maj. R. R. Bomford, *M.D.*, *M.R.C.P.* (127126) *R.A.M.C.* to be a Consultant, and is granted the local rank of Brig., 21st Apr. 1945.

**Regular Army Reserve of Officers.**

June 1.—Maj. F. C. Atkinson-Fleming, *M.C.*, *M.B.* (15655) having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., 7th May 1945.

June 5.—Lt.-Col. J. B. Scott, *M.C.*, *T.D.*, *M.B.* (7164) having attained the age limit, retires retaining the rank of Lt.-Col. 31st May 1945.

**TERRITORIAL ARMY.**

June 1.—Col. D. Dougal, *M.C.*, *T.D.*, *M.D.* (25911) late *R.A.M.C.* having attained the age

limit, retires 31st May 1945, retaining the rank of Colonel.

**ROYAL ARMY MEDICAL CORPS COMFORTS GUILD.**

The end of the war in Europe will still leave many calls on the Guild which will continue to help our men in South-East Asia as well as those in the Armies of Occupation in Europe. It is felt that these activities are unlikely to diminish for some time to come. Unfortunately there is no method as yet available to help our prisoners of war in the hands of the Japanese, but there may well be calls for such assistance at a later date. In the

meantime we have undertaken to help returned prisoners of war through the *R.A.M.C.* Association.

We are very grateful for the continued support from commands at home and abroad which has enabled us to carry on our work for so many years.

DULCIA HOOD,  
*R.A.M.C. Headquarters Mess, President.*  
Millbank, London, S.W.1.  
June 11, 1945.

**DEATHS.**

Captain S. O. G. HARRIS, *O.B.E.*, *R.A.M.C.*

The Director-General, Army Medical Services, writes:—

"Tiny Harris, one of the best-known figures in the Corps, has passed on.

"All who served in and around Aldershot in the years between the wars came in contact with him. He was a tower of strength to the Cambridge Hospital for very many years as specialist in oto-rhino-laryngology, as an operating surgeon and as a doctor whose opinion on a case was as highly valued as it was unstintingly given.

"His younger colleagues drew freely on his great knowledge and vast experience and admired his skill and his high standard of duty. Off duty in the Mess he was a good companion and a fine bridge player. Loyalty to his profession and to his Corps was an outstanding characteristic, and we are the poorer for the loss of a lovable character.

"Our sympathy goes out to his widow and family."

BOYLE.—In Dec., 1944, in Guernsey, Lieutenant-Colonel Michael Boyle, *O.B.E.*, *M.B.*, *R.A.M.C.*, Retired. Born in Skerries, Co. Dublin, Oct. 12, 1865, he took the *M.B.*, *R.U.I.*, in 1892, and was commissioned Surgeon Lieutenant Jan. 29, 1894. Promoted Captain, *R.A.M.C.*, Jan. 29, 1897, Major Jan. 29, 1906, and Lieutenant-Colonel March 1, 1915, he retired Aug. 24, 1919, and took up the Retired Pay appointment in Guernsey, which he held till Nov. 29, 1922. He served on the North-West Frontier of India in the Tirah Campaign of 1897-1898, being awarded the Medal

with two Clasps. He served in France in 1914-1915, and in Macedonia from Dec., 1915, till the end of the war. Twice mentioned, he received the *O.B.E.*, 1914 Star and Clasp, British War and Victory Medals.

HIME.—On April 24, 1945, Major-General Henry Charles Rupert Hime, *C.B.*, *D.S.O.*, late *R.A.M.C.*, Retired. Son of the late T. W. Hime, *M.D.*, he was born in Sheffield Nov. 8, 1877. He took the *M.B.*, *B.Ch.* Victoria University in 1899 and the *D.P.H.* Leeds in 1908. Commissioned Lieutenant, *R.A.M.C.*, Dec. 4, 1899, he was promoted Captain Dec. 4, 1902, Major June 4, 1911, Lieutenant-Colonel March 1, 1915, Brevet-Colonel June 28, 1924, Colonel Sept. 15, 1926, and Major-General April 15, 1930. He was appointed Honorary Physician to the King May 30, 1932, and created *C.B.* Jan. 1, 1934. He was an Instructor at the *R.A.M.C.* School of Instruction Feb. 5, 1906, to June 14, 1908, and Officer-in-Charge of *R.A.M.C.* Records Aug. 25, 1923, to Oct. 15, 1926. He was *D.D.M.S.*, Egypt, Nov. 25, 1926, to March 29, 1930, and *D.D.M.S.*, Southern Command, from April 15, 1930, till he retired April 15, 1934. He served in South Africa in 1900 to 1902, taking part in the operations in the Transvaal, Orange River Colony and Cape Colony, and being awarded the Queen's Medal with three Clasps and King's Medal with two Clasps. He served in France from Sept. 2, 1914, till the end of the war, as *D.A.D.M.S.* in 1915 and 1916 and as an *A.D.M.S.* in 1917, 1918 and 1919. He was wounded and five times mentioned in

despatches. He received the *D.S.O.* in 1917 and the Belgian War Cross in 1918, as well as the 1914 Star and Clasp, British War and Victory Medals.

Lieutenant-General Sir James Hartigan, *K.C.B.*, *C.M.G.*, *D.S.O.*, writes :—

"Will you allow me space to record my sincere regret at the death of Major-General H. C. R. Hime, *C.B.*, *D.S.O.*, which recently took place at a nursing home in London? That regret will be shared by many officers of the Corps who had the good fortune of being associated with him during his long and distinguished career in the Service. He and I first met in Sept., 1899, when we joined on the same day as Surgeons on Probation (*S.O.P.s*) at Netley. We were a big 'batch' and in time often referred to as 'the' batch, as many others have done before and since, and we regarded Hime as one of the ablest of our number.

"He joined exceptionally young and looked even younger than his age with the result that he was known among his friends as Boy Hime.

"Of a quiet and retiring disposition he was a keen student of his profession and was possessed of a very high sense of duty. As a result, his work as a doctor and later as an administrator was marked by foresight, thoroughness and efficiency. He was an officer of very high principles, and once he had made up his mind as to the right course to adopt, he carried it through unflinchingly.

"In the many responsible positions which he filled he invariably brought credit to his Service, and it can truly be said of him that he served his Corps faithfully and well.

"If in the years to come the *R.A.M.C.* can count on a sufficiency of officers of the ability and integrity of H. C. R. Hime, its future is assured."

ALLEN.—T.C.D. men will learn with deep regret of the death on April 29, 1945, of Major George Leverstone Allen, *M.A.*, Registrar of the School of Physic, within a week of his eighty-ninth birthday, having been born on May 25, 1856. Major Allen enlisted in the Army Hospital Corps Nov. 25, 1874, and was commissioned Quartermaster and Honorary Lieutenant, *A.M.S.*, June 9, 1897, being promoted Honorary Captain, *R.A.M.C.*, June 9, 1907. He retired after thirty-seven years' service Oct. 10, 1910, and was re-employed Aug. 5, 1914, till Dec. 20, 1919, being promoted Major March 29, 1916. Dublin University conferred the degree of *M.A. (jure officii)* on him in 1925. Major Allen served during a period of great change in the Army Medical Services. The Army Hospital Corps became the Medical Staff Corps in 1884, which in turn was absorbed in the *R.A.M.C.* in 1898. An acute observer, his reminiscences were most interesting. A gifted and exceedingly amusing raconteur, he was a truly delightful companion. He never seemed to repeat himself. There was never a dull moment when in his company.

Professor J. W. Bigger, Dean of the Faculty of Physic, School of Physic, Trinity College, Dublin, writes :—

"It was characteristic of Major Allen that he was at work regularly in his office in the School

until two months before his death, and that he then left his desk with the greatest reluctance. It is given to few men to work hard and continuously for over seventy years, but Major Allen was an exceptional man.

"In 1913 he was appointed Assistant Registrar, and in 1926 Registrar of the School of Physic. His connection with the School, therefore, covered a period of over thirty years. Throughout these years he was distinguished physically for his activity and erect carriage and mentally for his wonderful memory and meticulous accuracy. Until very recently his beautiful handwriting showed no trace of tremor. His urbanity was seldom ruffled and his courtesy and willingness to help were extended to all who entered his office, from the most senior member of the staff to the most junior student. He knew every student who passed through the School and was respected and loved by them all. His colleagues in the School will miss his experience, knowledge and wise guidance. His passing will be mourned by the staff and students of the School and by medical graduates of the University scattered over the world."

WILSON.—On May 5, 1945, Lieutenant-Colonel George Wilson, *R.A.M.C.*, Retired. Born in Dryfessdale, Dumfriesshire, Jan. 6, 1858, he took the *M.B.Edin.* in 1881, and was commissioned Surgeon Feb. 2, 1884, taking the 2nd Montefiore Prize. He was promoted Surgeon Major Feb. 2, 1896, and Lieutenant-Colonel, *R.A.M.C.*, Feb. 2, 1904. He retired Jan. 6, 1913, and was re-employed March 17, 1915, till Jan. 31, 1918. He took part in the Ashanti Campaign of 1895-1896, being included in a list of those who formed the Mobile Field Hospital and praised for good work which they performed. He received the Bronze Star. He served again in Sierra Leone in 1898-1899 in the Karene and Protectorate Expeditions in charge of medical arrangements, being awarded the Medal with Clasp. In South Africa he took part in the operations in the Orange Free State and Transvaal, and on the Zululand Frontier of Natal (Sept. and Oct., 1901), being awarded the Queen's Medal with three Clasps and the King's Medal with two Clasps. For his services during the war of 1914-1921, he was brought to notice for valuable services rendered in the list published Feb. 24, 1917. It is thought his estate will be about £100,000, and the General Relief Branch of the *R.A.M.C.* Fund will receive about £8,000.

BEATTY.—In Evesham Hospital on June 1, 1945, Lieutenant-Colonel Martyn Cecil Beatty, *M.B.*, *R.A.M.C.*, Retired. Born March 30, 1875, he took the *M.B.Edin.* in 1900 and the *D.P.H.*, *R.C.P.S.I.* in 1903. He joined the *R.A.M.C.* June 27, 1901. Promoted Captain June 27, 1904, Major March 27, 1913, and Lieutenant-Colonel June 3, 1923, he retired March 30, 1930. He took part in the operations in Cape Colony, Orange River Colony and Transvaal in 1902, being awarded the Queen's Medal with four Clasps. He served in France in 1914 and 1915, and in East Africa from 1916 till 1919. Mentioned in despatches, he received the 1914 Star and Clasp, British War and Victory Medals.

## EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. All such articles or papers, etc., intended for publication must be submitted in duplicate through the proper channels, i.e., Commanding Officer and A.D.M.S., or D.D.M.S., to the Under-Secretary of State, War Office P.R. (C. & P.), and not to A.M.D.2, otherwise such articles are liable to be returned to the authors and this may cause delay in publication.

Correspondence on matters of interest to the Corps and articles of a non-scientific character may be accepted for publication under a *nom-de-plume*.

All Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles. Owing to the acute shortage of paper it is necessary to limit Articles submitted for publication to the least number of pages possible. It is also desirable that the number of illustrations should be reduced.

A free issue of twelve reprints, or any lesser number to the extent applied for, will be made to contributors of Original Communications and of twelve excerpts, or any lesser number as above, in the case of Lectures, Travels, Clinical and other Notes, and Echoes of the Past. Such free reprints or excerpts will, however, only be sent to those specifying their wish to have them and a request for same should accompany the article when submitted for publication, stating the number of reprints or excerpts required.

Except as in the first paragraph above, communications in regard to editorial business should be addressed—"The Editor, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.5, War Office, Whitehall, S.W.1."

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Communications in regard to subscriptions, change of address, etc., should be addressed "THE MANAGER, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, A.M.D.2, War Office, Whitehall, S.W.1."

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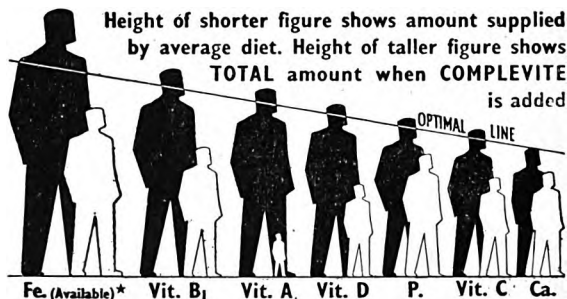
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# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

## Corps News.

JULY, 1945.

FROM THE "LONDON GAZETTE."

of June 14, 21 and 28, 1945.

### HONOURS AND AWARDS.

#### C.B.

Poole, Maj.-Gen. L. T. *D.S.O.*, *M.C.*, K.H.P.  
Phillips, Maj.-Gen. E. *C.B.E.*, *D.S.O.*, *M.C.*

#### C.B.E.

Charles, Col. G. F. (late A.D. Corps).  
Richmond, T/Col. A. E. *O.B.E.*  
Hepple, T/Brig. R. A. *O.B.E.*, *M.C.*  
Bayley, T/Brig. J. H. *M.C.*  
Mackenzie, A/Brig. J. M. *O.B.E.*, *M.C.*  
Morgan, T/Brig. J. G. *O.B.E.*, *T.D.*  
Stammers, L/Brig. F. A. R.

#### D.S.O.

Groves, T/Lt.-Col. J. N.  
Parker, T/Maj. G. E.  
Wright, T/Lt.-Col. D.

#### O.B.E.

Ahern, T/Lt.-Col. T. M. R.  
Baker, T/Lt.-Col. C. G.  
Brandon, T/Lt.-Col. W. J. M.  
Bunting, T/Lt.-Col. J. B.  
Bush, T/Col. F. K.  
Carr, Lt.-Col. T. E. *T.D.*  
Dolan, T/Col. S. O.  
Downie, T/Lt.-Col. V. J. *D.S.O.*, *M.C.*  
Dunn, T/Lt.-Col. J. H. *T.D.*  
Franklin, T/Col. R. V.  
Gabb, T/Lt.-Col. W. H.  
Graham, T/Lt.-Col. W.  
Hutchison, T/Lt.-Col. J. H.  
Kerr, T/Col. D. L. *T.D.*  
Lacey, T/Lt.-Col. M. de *T.D.*  
MacKeith, T/Lt.-Col. S. A.  
McNeill, T/Lt.-Col. K.  
Michie, T/Lt.-Col. A. M.  
Milne, T/Lt.-Col. J. B. M. *M.B.E.*  
Mull, T/Col. D. J. A.D. Corps.  
Paterson, A/Lt.-Col. M. MacR.  
Penman, T/Lt.-Col. A. H.  
Rea, T/Col. M. A.  
Rowe, Col. J. *M.C.*  
Sarsfield, T/Col. T. H.  
Scott, T/Lt.-Col. J. M.  
Sheppard, T/Lt.-Col. N. L.  
Sheppard, Lt.-Col. H. R.  
Smith, T/Lt.-Col. J.  
Smyth, T/Lt.-Col. R. P.

Stoddart-Scott, Lt.-Col. M. *M.C.*, *T.D.*

Taylor, T/Lt.-Col. R. S. *T.D.*

Turner, Lt.-Col. R. L.

Murrie, A/Prin. Matron A. G. *R.R.C.*

#### M.C.

Chamberlin, Capt. J. A.  
Cockburn, Capt. H. D.  
Cole, Capt. G. V.  
Cook, T/Maj. C. A. G. *G.M.*  
Hopkins, T/Maj. C. MacT.  
Jackson, Lt. R. H.  
Jamison, Capt. H. M. *M.B.E.*  
Kerr, Capt. E. D.  
McSheehy, T/Maj. H. O. P.  
Minford, T/Maj. H. J.  
Patton, Capt. G.  
Roderick, Lt. W. S.  
Waddell, T/Maj. R.  
Wallace, T/Maj. A. F.  
Williams, T/Maj. G.

#### M.B.E.

Ball, T/Maj. C. B.  
Baynes, W.O.I. K. A. 7367006  
Brown, Capt. J. M.  
Bunting, T/Maj. F. W.  
Calder, Capt. W. N.  
Cleland, T/Maj. G. J.  
Clow, T/Maj. J. M.  
Donaldson, Lt. (Q.M.) T.  
Estcourt, T/Maj. H. G.  
Farmer, Lt. (Q.M.) J. C.  
Field, T/Maj. T. E.  
Gill, Lt. (Q.M.) J. J.  
Harker, T/Maj. J. MacP.  
Hartley, T/Maj. B. P. R.  
Hunter, W.O.II. A.  
Jagger, T/Maj. D. B.  
Kelso, W.O.I. T. 7346346.  
Macdonald, Capt. R. J. A.  
Mackenzie, Maj. I.  
Malley, T/Maj. B. J.  
Mason, T/Maj. J.  
McKiddie, T/Maj. J. M.  
Ollerenshaw, Lt. G.  
Orchardson, T/Maj. R. L.  
Owen, T/Maj. D. L.  
Ross, T/Maj. J. McL.  
Stanley, Capt. (Q.M.) W. R.  
Waldock, W.O.I. K. G. 7354711  
Wale, W.O.I. J. A. 7260306.  
Wyman, Capt. J. B.  
Neal, Capt. R. B., A.D. Corps.

**B.E.M.**

Bell, S/Sgt. D. L. 7364038.  
 Brown, Sgt. R. G. 7522535.  
 Campbell, Sgt. J. 7516652.  
 Clarebone, L. Cpl. E. E. 7354809.  
 Clough, A/S.Sgt. L. 7389739.  
 Cooper, Cpl. N. H. A. 7385915.  
 Coster, A/Sgt. W. C. 740235.  
 Dempster, Sgt. D. R. S. 7347563.  
 Duncalfe, Sgt. N. H. B. 7387618.  
 Farrell, Sgt. W. N. 1506926.  
 Golding, A/L.Sgt. H. H. 7385509.  
 Harrison, Sgt. W. 7518761.  
 Howett, Sgt. C. 7358620.  
 Jessop, Pte. J. J. 7367416.  
 Judd, Sgt. J. J. 4969201.  
 May, Sgt. D. E. 7382966.  
 Morgan, Pte. J. L. 14713439.  
 Otway, Cpl. H. L. 7364735.  
 Pyke, Pte. L. A. 7264527.  
 Williams, A/W.O.II. E. J. 7348677.  
 Harding, S.Sgt. A. V. 7536243, A.D. Corps.  
 Morris, Sgt. J. B. 7537028, A.D. Corps.  
 Urquhart, S.Sgt. S. 7536424, A.D. Corps.

**M.M.**

Breckenridge, Pte. G. W. 7395891.  
 Claxton, Sgt. J. 7257202.  
 Dewsbury, Pte. S. 7361808.  
 Harris, L/Cpl. E. 7374366.  
 Hodgson, S/Sgt. A. E. 7345316.  
 Houghton, Cpl. H. 7346272.  
 Ruffle, Pte. A. J. 7392375.  
 Tierney, Pte. T. J. 7366837.

**T.D.**

Crawford, T/Lt.-Col. W. W.  
 Higham, T/Lt.-Col. A. R. C.  
 Kent, Maj. H. S.  
 Weiner, Maj. P.  
 Bowd, Maj. (Q.M.) E. S.  
 Brindle, Maj. (Q.M.) L. M.B.E.  
 Brookes, T/Maj. P.  
 Summers, Capt. (Q.M.) C. J.  
 Durie, T/Lt.-Col. J. F., A.D. Corps.

**MENTIONED.**

Sandford, T/Brig. F. R. C.B.E., M.C., T.D.  
 Paxton, T/Maj. A. E.  
 Irwin, Capt. J. P.  
 Lane, Lt. (Q.M.) F. C.  
 Baker, W.O.II. P. A. R. 7517102.  
 Evans, Sgt. G. 7266523.  
 Jacobs, Sgt. E. 7517829.  
 Wade, Sgt. J. D. 7368182.  
 Fowles, Cpl. E. J. 7384355.  
 Sweeny, Cpl. M. 7386185.  
 Heath, L/Cpl. A. R. 7395028.  
 Land, L/Cpl. F. W. 7521233.  
 Potts, Capt. A. B., A.D. Corps.

*Queen Alexandra's Imperial Military Nursing Service.*

**R.R.C.**

Bamber, Matron E. M.  
 Clark, A/Matron O.  
 Cullingford, A/Matron, E. J.  
 Davies, A/P.Matron K. B.

Dawe, A/P.Matron E. M. E.  
 Girdlestone, Matron D.  
 Hose, Matron C.  
 Hudson, A/P.Matron M. H. A.  
 Irving, A/Prin. Matron M.  
 MacRae, Matron C. J.  
 Ricks, A/P.Matron E. E.  
 Skehan, A/P.Matron M. M. B.  
 Watkin, P.Matron, E. E.  
 Withers, P.Matron I. C. C., A.R.R.C.

**A.R.R.C.**

Andrews, S.Sister J.  
 Bailey, Sister M. G.  
 Baxter, Sister E. J.  
 Coneys, A/Matron C. M.  
 Downing, Sister M.  
 Ferrier, Ast. Matron B. L.  
 Garland, Sister N. V.  
 Gaskell, Sister M.  
 Hemming, Sister D. B.  
 Higgins, Ast. Matron I. M. D.  
 Inskip, Sister E. C.  
 Johnson, Sister J.  
 Kitchener, Sister E. M.  
 L'Estrange, A/Sen. Sister E. C.  
 McMinn, Sen. Sister C. M.  
 Moore, Sister E.  
 Philip, Sister C.  
 Walbridge, Sister W. M.  
 Wilkinson, Sister Z. P. M.  
 Watson, Prin. Matron O. M., R.R.C.

*Territorial Army Nursing Service.*

**A.R.R.C.**

Anderson, Sister H. D. B.  
 Bather, Sister E.  
 Botting, Sister E. K.  
 Burry, Sister J. M.  
 Crane, Sister C. S. N.  
 Harrison, Sister H. M.  
 Haseldon, A/Sen. Sister L. M.  
 Hickson, Sister I. B.  
 Lyon, Sister E.  
 Medley, Sister A. E.  
 Parry, Sister L. A.  
 Yates, Sister M. E.

**MENTIONED.**

June 19.—Col. (local Maj.-Gen.) S. Arnott, C.B.E., D.S.O., M.D. (4215), late R.A.M.C., to be a D.D.M.S. and is granted the actg. rank of Maj.-Gen., 12th Apr. 1945.

Lt.-Col. H. A. Sandiford, M.C., M.B. (15676) from R.A.M.C. to be Col., 20th June 1945, with seniority, 28th Apr. 1943.

Maj. (War Subs. Lt.-Col.) T. F. M. Woods, M.D., M.R.C.P.I. (38600) to be Lt.-Col., 20th June 1945.

Lt. (Qr.-Mr.) (War Subs. Capt. (Qr.-Mr.)) H. S. Hill, M.B.E. (92822) to be Capt. (Qr.-Mr.) 17th June, 1945.

June 22.—Col. W. Frier, M.B. (15670), late R.A.M.C., having attained the age for retirement is retained on the active list, supern., 20th June 1945.

June 29.—Col. (Actg. Maj.-Gen.) E. A. Sutton, C.B.E., M.C. (8525), late R.A.M.C., to be temp. Maj.-Gen., 29th June 1945.

*July 6.*—Lt.-Col. E. L. F. Nash, *M.C.*, *M.B.* (8724), having attained the age for retirement, is retained on the active list (*supern.*), 7th July 1945.

Maj. E. H. Hall, *M.B.* (36782) to be Lt.-Col. 7th July 1945.

Maj. S. S. Dykes, *M.B.* (15704), reverts to ret. pay on account of disability, 5th July 1945, and is restored to the rank of Lt.-Col.

War Subs. Capt. Ian Wingate Caldwell, *M.B.*

(135089) from Emerg. Commn., is granted a Short Serv. Commn. in the rank of Lt., 17th June 1940, and to be Capt., 17th June 1941, with seniority next below Capt. A. M. Buchanan.

*July 10.*—Lt.-Col. J. H. Bayley, *M.C.* (8621) having attained the age for retirement is retained on the active list (*supern.*), 11th July 1945.

Maj. (War Subs. Lt.-Col.) G. A. Walmsley, *O.B.E.*, *M.B.* (36788) to be Lt.-Col., 11th July 1945.

## TERRITORIAL ARMY.

*July 3.*—Col. A. M. Johnson, *C.B.E.*, *M.C.*, *T.D.* (2642) (*T.A.*) (*retd.*) to be Hon. Col. 42nd (East Lincs.) Divisional R.A.M.C. 22nd May 1945.

*July 10.*—Maj. (Qr.-Mr.) E. M. Grierson (24546) to be Lt.-Col. (Qr.-Mr.) 11 Apr. 1945.

War Subs. Maj. J. G. McDowell, *M.D.* (51470) to be Maj., 11th Apr. 1945.

Capt. A. Houlbrooke (63334) to be Maj., 11th Apr. 1945.

War Subs. Maj. T. F. Briggs (56022) to be Maj., 11th Apr. 1945.

War Subs. Capt. (Qr.-Mr.) J. F. Williams (75902) to be Capt. (Qr.-Mr.) 11th Apr. 1945.

## THE ARMY DENTAL CORPS.

*July 10.*—Maj. J. L. Garrard (32472) having attained the age for retirement is retained on the active list (*supern.*), 7th June 1945.

## DEATHS ON ACTIVE SERVICE.

Capt. J. A. Harper. Died.

Capt. M. M. Paterson. Killed in Action.

Capt. W. D. Wilson. Killed in Action.

Capt. M. G. Braham. Died whilst P. of War.

Lieut. (Miss) E. M. Robson. Died.

Capt. C. W. Richards. Died

## DEATHS.

**GREGG.**—On May 26, 1945, the Venerable Richard George Stanhope Gregg, *M.B.*, *B.D.*, Archdeacon of Elphin and Ardagh, late Lieutenant-Colonel, R.A.M.C., Retired. Born Dec. 9, 1883, he took the *M.B.* Dublin in 1907 and entered the service as Lieutenant, R.A.M.C., July 29 of that year. Promoted Captain, Jan. 29, 1911, and Major July 29, 1919, he retired with the rank of Lieutenant-Colonel Sept. 10, 1927. He served with the Aden Field Force in 1915 and in France in 1917 and 1918, being awarded the 1914-15 Star, British War and Victory Medals. At school he won exhibitions in each of the three grades of the Irish Intermediate Examinations. He was Captain of the Dublin University Hockey Club and an international hockey player. On retirement he entered the Divinity School of Trinity College, Dublin, where he won the Downes Premium, first prize in Biblical Greek and the Weir Prize (first place). He took Holy Orders on July 1, 1928, and was appointed Archdeacon of Elphin and Ardagh in 1940. He was a man of wide reading and attractive personality. His work for the Church and his influence in her councils will be greatly missed.

**GAYER-ANDERSON.**—In Lavenham, Suffolk, on June 16, 1945, Major Robert Grenville Gayer-Anderson, R.A.M.C., Retired. Born July 29, 1881, he was commissioned Lieutenant in the R.A.M.C. Jan. 30, 1904, and promoted Captain three years later when he was seconded for service

with the Egyptian Army. Promoted Major July 30, 1907, he retired Nov. 13, 1920. He was a member of the Sudan Sleeping Sickness Commission, Leprosy Commission and Anthropological Research 1910-1913. He withdrew from medical practice and was appointed Assistant Adjutant-General for Recruiting Egyptian Army in 1914. During the Egyptian Revolution of 1919, he was Senior Political Officer, Upper Egypt, and investigated the Deirut train murder. He served on the Tagoi Patrol in the Sudan in 1910, being mentioned in despatches, awarded the Sudan Medal with Clasp and 4th Class Medjidie. In the war of 1914-1918 he served in Egypt, Gallipoli, Sudan, Arabia, Arab Bureau, Cairo, and as Political Officer Red Sea Patrol. He was wounded, mentioned in despatches and received the Third Class Order of the Nile, 3rd Class Order of Nahada (Hedjaz), 1914-15 Star, British War and Victory Medals.

Major Colin Cassidy, *M.C.*, writes :—

"Gayer-Anderson was a man of remarkable character and personality. Originally a good doctor, he might have been a first class one had he not found in Egypt the great and absorbing interest of his life in the study and collection of Oriental works of art, on which he became an expert of international repute. He also became an expert on the Arabic language and was known not only in artistic circles, but to large numbers of Egyptians. As a result he was asked by the



Government of Egypt to take up the appointment of Senior Inspector of the Ministry of the Interior in 1920 at a very critical period, and eventually became Oriental Secretary at the Residency in 1922. During this period he purchased a XVI century Arab House in Cairo, which became a Mecca of all those with a knowledge of Egyptian Art. He retired from Government service in 1924, but resided in Cairo until 1942 when he handed over his house and contents to the Egyptian Government as a Museum of Oriental Arts and Crafts. This was gratefully accepted by the Egyptian Government, who conferred on him the rank of Lewa, which carries with it the title of Pasha.

"He then retired to Little Lavenham Hall, in Suffolk, where he lived with his brother, who is almost equally erudite, and in recent years he had been giving away his unique and extremely valuable collection to museums in this country. In conversation, on his own subject, he could not be surpassed, and on other topics he was always extremely well informed and witty. No wonder that the house in Cairo was seldom without a visitor. He will be a great loss to his many friends."

WALTON.—On June 21, 1945, Lieutenant-Colonel Henry Beccles Gall Walton, D.P.H.England, R.A.M.C., Retired. Born in Montreal Jan. 2, 1873, he took the M.R.C.S. and L.R.C.P.London in 1897, and entered the R.A.M.C. July 27, 1898. Promoted Captain July 27, 1901, Major April 27, 1910, and Lieutenant-Colonel March 1, 1915, he

retired Oct. 11, 1922. He served in Sierra Leone in 1898-1899, receiving the Medal with Clasp. In South Africa, 1899-1902, he took part in the actions at Vet River (May 5 and 6, 1900) and Zand River; actions near Johannesburg, Pretoria and Diamond Hill (June 11 and 12, 1900); actions at Belfast (Aug. 26 and 27, 1900); and operation in Cape Colony, being awarded the Queen's Medal with five Clasps and the King's Medal with two Clasps. He served in France and Egypt during the war of 1914-1918, receiving the British War and Victory Medals. His son, Lieutenant-Colonel Henry Courtenay Walton, is still serving in the Corps.

UNWIN.—On July 5, 1945, in Bournemouth, Lieutenant-Colonel Thomas Barton Unwin, O.B.E., R.A.M.C., Retired. Born Mar. 7, 1874, he took the M.B. Edinburgh in 1899. Having served as a Civil Surgeon from May 28, 1900, he was appointed Lieutenant, R.A.M.C., from the Imperial Yeomanry Nov. 14, 1900. Promoted Captain Nov. 14, 1903, Major Nov. 14, 1912, and Lieutenant-Colonel Feb. 23, 1923, he retired Mar. 7, 1929. In South Africa 1899-1902, he took part in the action at Rhenoster Kop, action at Kheis and operations in the Orange River Colony. He received the Queen's Medal with four Clasps. In the war of 1914-1918, he saw service in France in 1914 and 1915, in East Africa in 1915 and again in France 1917-1919. Thrice mentioned in despatches, he received the O.B.E., 1914 Star, British War and Victory Medals, and was created a Companion of the Military Order of Avis.

# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

## Corps News.

AUGUST, 1945.

FROM THE "LONDON GAZETTE"  
of July 12, 19 and 20, 1945.

### HONOURS AND AWARDS.

#### BAR TO MILITARY CROSS.

Moore, Capt. E. L., *M.C.*

#### M.C.

Blair, Capt. W.  
Clark, Capt. J.  
Esmonde, Capt. P.  
Harries, Lieut. A. O.  
Hennessy, Lieut. N. St. J.  
Keat, Lieut. E. C. B. S.  
McCallum, T/Maj. D. I.  
Ollerenshaw, Lieut. G. *M.B.E.*  
Prentice, Capt. A. I.  
Wilson, Capt. T. McS.

#### M.B.E.

Jones, Capt. E. J.

#### M.M.

Boon, S/Sgt. E. H. 7380470.  
Brett, A/Cpl. E. T. 7345423.  
Carter, Cpl. R. 7357258.  
Lenton, Pte. P. M. 97006473.  
Margereson, Pte. A. 14647506.  
Owen, Cpl. H. F. C. 7380321.  
Robb, Col. J. V. 7357754.

#### MENTIONED.

##### [ITALY]

Townsend, T/Brig. E. M. *M.C.*  
Cheyne, A/Brig. D. G. *C.B.E.*, *M.C.*  
Bishop, T/Col. G. W. R. *O.B.E.*, *T.D.*  
Mackenzie, T/Col. J. M. *C.B.E.*, *M.C.*  
Rees, T/Col. R. E. *M.C.*, *T.D.*  
Robinson, T/Col. J. T.  
Ahern, T/Lt.-Col. T. M. R.  
Capper, T/Lt.-Col. W. M.  
Croom, T/Lt.-Col. J. H.  
Feggetter, T/Lt.-Col. G. Y.  
Grant, T/Lt.-Col. R. T.  
McNeill, T/Lt.-Col. K. *O.B.E.*  
Mannington, T/Lt.-Col. H.  
Miller, T/Lt.-Col. J. S.  
Murphy, T/Lt.-Col. T. P. P.  
Niven, T/Lt.-Col. R. J. *M.C.*  
Savage, T/Lt.-Col. O. A.  
Sheehan, T/Lt.-Col. H. L.  
Trotter, T/Lt.-Col. J. *O.B.E.*  
Turner, T/Lt.-Col. R. J. *O.B.E.*  
Ward, T/Lt.-Col. H. S. *O.B.E.*  
Nichols, A/Lt.-Col. H. W. L. *T.D.*

Fowler, Maj. E.  
Ashcroft, T/Maj. D. W.  
Austin, T/Maj. D. S.  
Barnard, T/Maj. H. M.  
Bell, T/Maj. D.  
Bridges, T/Maj. H.  
Bullough, T/Maj. A. S.  
Carey, T/Maj. W. A.  
Croghan, T/Maj. H. J.  
Dawes, T/Maj. L. F.  
Edwards, T/Maj. F. H. *M.C.*  
Evans, T/Maj. A. B.  
Everatt, T/Maj. W. R.  
Fidler, T/Maj. H. K.  
Field, T/Maj. T. E. *M.B.E.*  
Finlayson, T/Maj. M. C. K.  
Giles, T/Maj. A. M.  
Harper, T/Maj. E. H. C.  
Heasman, T/Maj. L.  
Hobbin, T/Maj. G. M.  
Lawson, T/Maj. O. P. D.  
Macleod, T/Maj. W. M.  
Mallen, T/Maj. K. C.  
McEwen, T/Maj. R. J. B.  
Mitchell, T/Maj. P. C. *M.C.*  
Nicholson, T/Maj. W. F.  
O'Brien, T/Maj. H. D.  
Ollerenshaw, T/Maj. R. G. W.  
O'Neill, T/Maj. P. L.  
O'Riordan, T/Maj. J. D.  
Orleck, T/Maj. A. *M.B.E.*  
Owen, T/Maj. D. L. *M.B.E.*  
Patterson, T/Maj. J. H.  
Ramsey, T/Maj. A. S.  
Rob, T/Maj. C. G. *M.C.*  
Settle, T/Maj. H. L.  
Thornley, T/Maj. R.  
Topping, T/Maj. R. A. R.  
Torrens, T/Maj. D. J. D.  
Wheeler, T/Maj. F. E.  
White, T/Maj. A. B.  
Wiles, T/Maj. W. J.  
Wilson, T/Maj. W.  
Yofe, T/Maj. J.  
Walker, A/Maj. P. K.  
Bennett, Capt. J. R.  
Bramwell, Capt. D. C. B.  
Brown, Capt. A. L.  
Davison, Capt. P. H.  
Dick, Capt. D. S.  
Greenwood, Capt. E.  
Guild, Capt. A. A.  
Gwynn, Capt. A. M.  
Hills, Capt. (Q.M.) A. J.  
James, Capt. P. M.  
John, Capt. G. H. P.

Keir, Capt. R. M. J.  
 Kennedy, Capt. H. C.  
 Levine, Capt. H.  
 Macdonald, Capt. R. J. A. *M.B.E.*  
 McInroy, Capt. J. M.  
 Montgomery, Capt. L. C.  
 Morris, Capt. H. B.  
 Mowschenson, Capt. H.  
 Peckitt, Capt. K. I.  
 Pinching, Capt. J.  
 Reeks, Capt. J. J.  
 Robertson, Capt. G. T.  
 Rodger, Capt. A. F.  
 Ross, Capt. R. W.  
 Shields, Capt. R.  
 Stewart, Capt. A. M.  
 Tait, Capt. G. B.  
 Taylor, Capt. V. N.  
 Vellacott, Capt. H. D. S.  
 Adlam, T/Capt. J. P.  
 Brunton, T/Capt. J. S.  
 Camrass, T/Capt. L.  
 Downes, T/Capt. F. J.  
 Hammond, T/Capt. J. A. J.  
 McQuade, T/Capt. H. G.  
 Mond, T/Capt. N. C.  
 Frame, Lt. R.  
 Loosmore, Lt. N. L.  
 Rowland, Lt. D. J. L.  
 Waters, Lt. E. D.  
 Williams, Lt. (Q.M.) G. L.  
 7259939 W.O.I. R. Adams.  
 7516038 W.O.I. G. Blenkinsop.  
 6087887 W.O.I. A. Brown.  
 7346167 W.O.I. J. M. Hardie.  
 7261492 W.O.I. M. J. Jackson (now Lt. (Q.M.)).  
 3956398 W.O.I. W. J. Power.  
 7630292 W.O.I. J. A. Price.  
 7261750 W.O.I. C. R. Strachan.  
 7372314 W.O.I. A. H. Sykes.  
 7518104 A/W.O.I. A. H. French.  
 2692971 A/W.O.I. W. G. Keal.  
 7358300 A/W.O.I. W. Mewes.  
 7370945 W.O.II. C. A. Brown.  
 7357590 W.O.II. G. S. Bumstead.  
 7357798 W.O.II. H. A. Fraser.  
 7262096 W.O.II. A. E. Goodwin.  
 6846863 W.O.II. C. A. Read.  
 7522418 W.O.II. A. E. J. Turner.  
 7518545 A/W.O.II. C. Smith.  
 7358024 A/W.O.II. R. Wilson.  
 7371104 S/Sgt. G. Davidson.  
 6284998 S/Sgt. W. G. Edwards.  
 7354454 S/Sgt. J. G. French.  
 7345998 S/Sgt. W. H. Graham.  
 7262570 S/Sgt. T. McGuire.  
 7358236 S/Sgt. W. Phillips.  
 7379464 S/Sgt. R. F. Ponting.  
 7376700 S/Sgt. J. Raeside.  
 7369244 S/Sgt. J. A. Rance.  
 7383019 S/Sgt. R. W. R. Rixson.  
 7266952 S/Sgt. G. S. Rowell.  
 7516814 S/Sgt. W. Scott.  
 7371893 S/Sgt. D. M. Straw.  
 7364154 S/Sgt. C. V. Wareham.  
 7263104 Sgt. A. E. A. Bevan.  
 7374468 Sgt. G. Channing.  
 7358415 Sgt. E. H. Chart.  
 7369363 Sgt. J. R. Cooper.  
 7344490 Sgt. E. Evans.  
 3341938 Sgt. T. Foster.  
 7345034 Sgt. A. Fraser.  
 7345470 Sgt. T. Garrett.

543730 Sgt. G. Holland (since killed in action).  
 7518903 Sgt. S. C. Johnson.  
 7517595 Sgt. H. J. Jones.  
 7518600 Sgt. W. G. Lowe.  
 7257815 Sgt. C. R. Michell.  
 7374510 Sgt. T. H. Patch.  
 6908752 Sgt. E. A. Slade.  
 7261324 Sgt. H. Solley.  
 7369890 Sgt. T. W. Ursito.  
 7518610 Sgt. E. N. Wayne.  
 2610378 Sgt. A. Wilde.  
 7365728 Sgt. F. J. Willson.  
 7266677 A/Sgt. K. A. R. Secker.  
 7356509 L/Sgt. G. F. Smart.  
 7382672 Cpl. J. W. D. Baker.  
 7578732 Cpl. V. Bennett.  
 7381937 Cpl. T. E. Burfield.  
 7379551 Cpl. A. H. Chalmers.  
 7385206 Cpl. F. L. Darrell.  
 7359240 Cpl. D. S. Fox.  
 7262156 Cpl. J. S. D. Hayward.  
 7380749 Cpl. S. W. G. Luxford.  
 7382921 Cpl. J. C. R. Nutley-Emsley.  
 7368698 Cpl. L. E. Parkes.  
 7380891 Cpl. G. Ritchie.  
 7364554 Cpl. J. A. Taylor.  
 7382510 Cpl. J. W. Thomson.  
 7388938 Cpl. E. W. Whitehouse.  
 7381930 L/Cpl. M. J. Bailey.  
 7366627 L/Cpl. V. D. Brittain.  
 7401020 L/Cpl. G. G. Brown.  
 7378672 L/Cpl. H. Clay.  
 7403560 L/Cpl. G. Gowland.  
 7370205 L/Cpl. L. Jessop.  
 7266195 L/Cpl. W. M. Jupp.  
 7364506 L/Cpl. F. D. Pinnell.  
 7379593 L/Cpl. J. H. Watson.  
 7360754 L/Cpl. J. R. Waugh.  
 7398608 L/Cpl. W. G. Williams.  
 7376339 L/Cpl. R. G. Wood.  
 7368236 Pte. S. Bussey.  
 7390772 Pte. W. E. A. Cooper.  
 7377524 Pte. C. C. Ellis.  
 7382904 Pte. F. G. Hammond.  
 7398137 Pte. A. Hearn.  
 14226780 Pte. W. Hill.  
 7367565 Pte. A. C. King.  
 7396852 Pte. G. Lyons.  
 7393644 Pte. W. H. Paske.  
 7371262 Pte. T. Sharpe.  
 7522038 Pte. H. V. Spragg.  
 3718683 Pte. D. O. Wallis.  
 13049691 Pte. W. M. Ward.  
 7389369 Pte. R. J. Woodward.

*The Army Dental Corps.*

Bradbeer, T/Lt.-Col. W. H.  
 Gibson, Capt. R. C.  
 Glass, Capt. D. F.  
 Lawson, Capt. D. MacN.  
 Low, Capt. G. C.  
 Straughan, Capt. C. H.  
 7536251 Sgt. H. J. Green.  
 7536643 Cpl. J. A. Beadell.

*Queen Alexandra's Imperial Military Nursing Service.*

Edmunds, A/Prin. Matron, E. M.  
 Ricks, A/Prin. Matron E. E.  
 Irving, Matron M. R.R.C.  
 Macdonald, A/S. Sister J.  
 Bradey, Sister L. E.  
 Denis, Sister M.

Gibson, Sister S.  
 Jack, Sister V. M.  
 King, Sister C. J.  
 Smith, Sister B. H.  
 Williams, Sister M.

*Territorial Army Nursing Service.*

Simpson, A/Prin. Matron K. M. A. R.R.C.  
 Lacey, A/S. Sister L. E. H.  
 Cowell, Sister E. C.  
 Daly, Sister M. K.  
 Hobson, Sister A.  
 Irvin, Sister E. M.  
 Jackson, Sister S. A.  
 McFarlane, Sister R. C.  
 Mackenzie, Sister L. S.  
 Moat, Sister A. S.  
 Newberry, Sister R.  
 Redhead, Sister B.  
 Sterlini, Sister M. M.  
 Stevenson, Sister E. M.  
 Tucker, Sister B.  
 Young, Sister S.

[BURMA]

Winter, T/Brig. H. G. M.C.  
 Panton, A/Brig. D. F.  
 Baird, T/Col. J. H. (Res. of Off.).  
 Bekenn, T/Col. A. O. O.B.E.  
 Dawson, T/Col. J. R.  
 Arundell, A/Col. S. W. K.  
 Ayrey, T/Lt.-Col. F.  
 Burbridge, T/Lt.-Col. D. H. D.  
 Burns, T/Lt.-Col. A.  
 Gass, T/Lt.-Col. H.  
 Heugh, T/Lt.-Col. G. B.  
 Martin, T/Lt.-Col. A. J.  
 Pace, T/Lt.-Col. T. A.  
 Raban, T/Lt.-Col. J. P.  
 Steen, T/Lt.-Col. J. R.  
 Valentine, T/Lt.-Col. D. S.  
 Wenyon, T/Lt.-Col. E. J. M.  
 Dimson, A/Lt.-Col. S. B.  
 Abbott, T/Maj. K. D. G.  
 Adamson, T/Maj. D. G.  
 Baker, T/Maj. D. M.  
 Evans, T/Maj. F. I.  
 Nicholas, T/Maj. P. B. L.  
 O'Connell, T/Maj. P. J.  
 Pinder, T/Maj. G. W.  
 Raeburn, T/Maj. C. I.  
 Ross, T/Maj. G. I. M.  
 Campbell, A/Maj. R. M.  
 Stokes, A/Maj. J. F.  
 Camus, Capt. B. E.  
 Citron, Capt. S.  
 Davis, Capt. P. J. R.  
 Doupe, Capt. J. W.  
 Good, Capt. H. W. W.  
 Gunn, Capt. D. R.  
 Hart, Capt. H. L.  
 Henry, Capt. J. C.  
 Hill, Capt. A. P. J.  
 Hodgson, Capt. L. P.  
 Jeffrey, Capt. J. C.  
 Jones, Capt. E. L. H.  
 Leask, Capt. J. C.  
 O'Hara, Capt. J.  
 Pedersen, Capt. N. M.C.  
 Stanton, Capt. H. G.  
 Watson, Capt. D. B.  
 Wells, Capt. B. G.

Wright, Capt. R. B.  
 Blacklee, T/Capt. D.  
 Teanby, Lt. (Qr.-Mr.) W. J.  
 7260777 W.O.I. S. G. Frampton.  
 3521713 A/W.O.II. H. C. Davies.  
 7388249 S/Sgt. E. J. Iles.  
 7257265 S/Sgt. W. A. Hobday.  
 7382710 A/S. Sgt. J. E. Garrett.  
 7382793 Sgt. W. J. Ashwell.  
 7362083 Sgt. H. D. Brown.  
 7266496 Sgt. C. E. Cope.  
 7267183 Sgt. W. S. Davison.  
 7363492 Sgt. A. Dugmore.  
 7535161 Sgt. W. G. Hiscocks.  
 7516252 Sgt. A. Jervis.  
 7365746 Sgt. L. Nunn.  
 7373864 Sgt. T. Proctor.  
 7365596 Sgt. H. A. Wall.  
 7375933 Cpl. A. J. Ashmore.  
 7365749 Cpl. R. A. Marsh.  
 7519494 Cpl. G. Y. Moyes.  
 7403038 Cpl. E. D. Trevillion.  
 7264298 L/Cpl. W. Foley.  
 7522460 Pte. W. F. Adams.  
 7379582 Pte. D. Arran.  
 7384648 Pte. P. R. Fry.  
 7262247 Pte. A. J. Graham.  
 7373704 Pte. G. W. Lester.  
 7266253 Pte. A. B. McKellar.  
 7402738 Pte. D. A. McLennan.  
 7382066 Pte. J. R. Roberts.  
 7365597 Pte. J. E. Wells.

*The Army Dental Corps.*

10511236 Cpl. F. Horton.  
 7538199 Cpl. W. H. Wright.

*Queen Alexandra's Imperial Military Nursing Service.*

McGearey, A/Matron A. M.B.E., A.R.R.C.  
 O'Connor, A/Matron M. E.  
 Duncan, Sister J. T.  
 Hobday, Sister B.  
 Lewis, Sister M. E. A.R.R.C.  
 Smith, Sister E. A.

*Territorial Army Nursing Service.*

Rothwell, A/Matron L.

*July 17.*—The undermentioned Lts. (Qr.-Mrs.) (War Subs. Capt. (Qr.-Mrs.)) to be Capt. (Qr.-Mrs.), 15th July 1945:

J. W. Price, M.B.E. (95419).  
 E. V. Munden (95420).  
 G. E. Box (95458).  
 R. M. Morrison (95459).  
 G. J. D. Webberley (95457).

*July 31.*—Col. J. W. C. Stubbs, D.S.O., M.C., M.B. (4221), late R.A.M.C., on completion of four years in the rank is retained on the Active List supern., 1st Aug. 1945.

Maj. J. E. Rea, M.B. (1075), to be Lt.-Col., 1st Aug. 1945, with seniority 4th Oct. 1944.

*August 3.*—Lt.-Col. R. F. Walker, C.B.E., M.C., M.B. (22118), from R.A.M.C., to be Col., 1st Aug. 1945, with seniority 11th May 1943.

Maj.-Gen. O. W. McSheehy, C.B., D.S.O., O.B.E., M.B., K.H.S. (15664), late R.A.M.C., retires on ret. pay, 3rd Aug. 1945.

## TERRITORIAL ARMY.

July 31.—Col. Sir E. M. Cowell, *K.B.E., C.B., D.S.O., T.D., M.D., F.R.C.S., K.H.S.* (2804), late R.A.M.C., to be Maj.-Gen., 11th Apr. 1945.

Col. G. J. Linklater, *O.B.E., T.D., M.D.* (30439),

late R.A.M.C., having attained the age limit, retires 21st July 1945, retaining the rank of Col.

War Subs. Maj. F. L. Ker, *M.B.* (53493) to be Maj., 11th Apr. 1945.

## THE ARMY DENTAL CORPS.

August 3.—Capt. C. W. Upton (65890) to be Maj. 1st Aug. 1945.

August 7.—The undermentioned Offrs. holding short service comms. to be Cpts. :—

17th Apr. 1945 :—

Capt. H. D. Freeman (90114).

8th May 1945 :—

Capt. E. A. French (92370).

26th June 1945 :—

Capt. M. F. Porterfield (76055).

31st July 1945 :—

Capt. J. H. Robertson (96496).

## Erratum.

"CORPS NEWS," July, 1945, p. 2—

Delete "MENTIONED" in second column.

## DEATHS.

POWELL.—On May 5, 1945, Lieutenant-Colonel Caleb Keáys Powell, *M.D., M.Ch., R.A.M.C., Retired.* Born in Templeberry, Co. Tipperary, Jan. 30, 1851, he took the *M.D., M.Ch.*, Royal University of Ireland in 1873, and entered the Army as Surgeon Aug. 5, 1877. Promoted Surgeon Major Aug. 5, 1889, and Surgeon Lieutenant-Colonel Aug. 5, 1907, he retired Aug. 21, 1897. Title changed to Lieutenant-Colonel, *L. G.* Aug. 9, 1898. He was employed when on the Retired List at Clonmel from Nov. 24, 1897, till the end of 1902 or beginning of 1903. He took part in the Afghan War, 1878-1880, receiving the Medal.

DELAP.—In Dublin on June 27, 1945, Colonel George Goslett Delap, *C.M.G., D.S.O.,* late *R.A.M.C., Retired.* Son of the late Rev. Canon Delap, he was born in Maghera, Co. Donegal, April 13, 1873. Having taken the *L.R.C.P.I.* and the *L.R.C.S.I.* in 1896 he entered the *R.A.M.C.* on July 27, 1899. Promoted Captain July 27, 1902, Major April 27, 1911, Lieutenant-Colonel March 1, 1915, and Colonel Dec. 26, 1925, he retired Dec. 26, 1929. He was an Assistant Instructor *R.A.M.C. School of Instruction* 1908 to 1912. He was appointed Honorary Surgeon to the Viceroy of India Dec. 29, 1927. He was awarded the Royal Humane Society's Bronze Medal for saving life on June 23, 1916,

in the Shat-al-Arab, a deep and swiftly flowing river. After retirement he sailed for years as Surgeon on the Shaw Savill & Albion Co.s and Aberdeen Line ships. In South Africa, 1899-1902, he took part in the advance on Kimberley, including the action at Magersfontein, where he won the *D.S.O.* He was subsequently present at the Relief of Kimberley, operations at Paardeberg (Feb. 17 to 26, 1900), actions at Karee Siding, Vet River (May 5 and 6, 1900), and Zand River. Actions near Johannesburg, Pretoria and Diamond Hill (June 11 and 12, 1900). Actions at Reit Vlei. Operations in Cape Colony. Twice mentioned in despatches, in addition to the *D.S.O.* he received the Queen's Medal with four Clasps and the King's Medal with two Clasps. In the war of 1914-1918 he saw service in Macedonia in 1915 and 1916, and in Mesopotamia 1917 and 1918, and in Persia and the Persian Gulf 1918-1919. Twice mentioned, he was created *C.M.G.* and awarded the 1914-15 Star, British War and Victory Medals. He again saw service in the Arab Rising in Mesopotamia in 1920, receiving the Medal with Clasp. He married Dorothy Mary, younger daughter of the late Major-General W. J. Fawcett, *C.B.,* late *R.A.M.C.,* and sister of Colonel H. H. J. Fawcett, *D.S.O.,* late *R.A.M.C.* His son, Major P. Delap, is serving in the Corps and has won the *M.C.* in this war.



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# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

## Corps News.

SEPTEMBER, 1945.

FROM THE "LONDON GAZETTE"  
of August 9 and 30, 1945.

### HONOURS AND AWARDS.

#### MENTIONED.

##### [NORTH-WEST EUROPE]

Phillips, Maj.-Gen. E. C.B., C.B.E., D.S.O., M.C.  
Stubbs, Col. J. W. C. D.S.O., M.C.  
Dickson, T/Col. A. T. B. O.B.E., T.D.  
Helm, T/Col. C. D.S.O., O.B.E., M.C.  
Jenkins, T/Col. J. P. J. T.D.  
Oram, T/Col. A. R. M.C.  
Bainbridge, T/Lt.-Col. C.  
Cowie, T/Lt.-Col. A.  
Evans, T/Lt.-Col. M. H. M.B.E.  
Evans, T/Lt.-Col. R.  
Hellier, T/Lt.-Col. F. F.  
Lassen, T/Lt.-Col. E. H. P.  
MacMyn, T/Lt.-Col. D. J. T.D.  
Mitchell, T/Lt.-Col. G. A. G.  
Tunbridge, T/Lt.-Col. R. E. O.B.F.  
Barraclough, T/Maj. R.  
Bleakley, T/Maj. J.  
Burridge, T/Maj. J. A. C.  
Carter, T/Maj. G. B.  
Crawford, T/Maj. N. J.  
Dixon, T/Maj. H. B. L.  
Elliott, T/Maj. C. M.  
Halliday, T/Maj. W.  
Herdman, T/Maj. K. N. A.  
Hunt, T/Maj. P. W.  
Mair, T/Maj. W. F.  
Maitland, T/Maj. D. D.  
Martin, T/Maj. N. H.  
McCallum, T/Maj. D. I. M.C.  
McDermott, T/Maj. (Qr.-Mr.) B. A.  
McGregor, T/Maj. R. M.  
Paddison, T/Maj. D. J.  
Roberts, T/Maj. (Qr.-Mr.) W. T.  
Shaw, T/Maj. J. B.  
Talbot, T/Maj. J. E.  
Thompson, T/Maj. H. R.  
Thompson, T/Maj. R. S.  
Thornton, T/Maj. H. L.  
Watt, T/Maj. J. C.  
Wilson, T/Maj. K. S.  
Wolfe, T/Maj. H. L.  
Anderson, Capt. J. T.  
Cameron, Capt. (Qr.-Mr.) R. N. B.  
Chalmers, Capt. R. D.  
Cruikshank, Capt. J. J.  
Dawson, Capt. J.  
Dobson, Capt. R.  
Hollingsworth, Capt. J. S.  
Houghton, Capt. A. C.

Kelly, Capt. (Qr.-Mr.) J.  
L'Etang, Capt. H. J. C. J.  
Mackie, Capt. (Qr.-Mr.) R.  
Macknight, Capt. A. T.  
Marwick, Capt. Miss R. M.  
Mason, Capt. S. A.  
McGeorge, Capt. R. S.  
Mills, Capt. C. N.  
Milstein, Capt. B. B.  
Scott, Capt. J. M.  
Sherwell, Capt. M. H.  
Thin, Capt. R. T.  
Wright, Capt. C. R.  
Smith, A/Capt. (Qr.-Mr.) G. F.  
Hall, Lt. (Qr.-Mr.) A. N.  
Harries, Lt. A. O. M.C.  
Hunter, Lt. (Qr.-Mr.) R. C.  
Mills, Lt. W.  
Widdop, Lt. (Qr.-Mr.) G.  
Brown, T/Maj. W. J. A.D. Corps.  
Holland, T/Maj. N. W. A. A.D. Corps.  
Harrison, Capt. C. G. W. A.D. Corps.  
Cove-Jones, Capt. A. E. A.D. Corps.

#### *Queen Alexandra's Imperial Military Nursing Service.*

Wade, T/Prin. Matron S. A. W. R.R.C.  
Gray, A/Prin. Matron M. R.R.C.  
Rawlings, A/Prin. Matron M. H. R.R.C.  
Underhill, A/Prin. Matron D. L. R.R.C.  
Swinton, A/S.-Sister D. A.  
Albrecht, Sister M. P. A.  
Aldwinkle, Sister W. L. A.R.R.C.  
Buttigieg, Sister D. M.  
Gray, Sister F.  
Lawson, Sister M. B.

#### *Territorial Army Nursing Service.*

Tweedle, T/Prin. Matron B. R.R.C.  
Kelly, Sister L. E. M.  
Lusk, Sister H. J. R.

#### EFFICIENCY DECORATION.

Hankey, Lt.-Col. G. T.  
Bainbridge, T/Lt.-Col. R. E. M.  
Hutcheon, T/Lt.-Col. E.  
Ker, T/Lt.-Col. F. L.  
May, T/Lt.-Col. P. J. M.B.E.  
Nicholson, T/Lt.-Col. D. N.  
Facey, Major R. V.  
Ingram, Major H. V.  
MacIver, Major D. P. M.C.

August 10.—Col. J. W. C. Stubbs, D.S.O., M.C.  
M.B. (4221) (late R.A.M.C.) on completion of four  
years in the rank is retained on the Active List

(supern.), 1st Aug. 1945. (Substituted for the notifn. in *Gazette* (Supplement) dated 31st July 1945.)

Col. (temp. Maj.-Gen.) E. A. Sutton, *C.B.E.*, *M.C.* (8525), late R.A.M.C., to be Maj.-Gen., 1st Aug. 1945.

Col. H. G. Winter, *M.C.* (8522), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern., 10th Aug. 1945.

Lt.-Col. W. D. Anderton, *M.C.*, *M.B.* (26293) from R.A.M.C., to be Col., 1st Aug. 1945, with seniority 26th May 1943.

Lt.-Col. D. W. Beamish, *M.C.* (15333), from R.A.M.C., to be Col., 10th Aug. 1945, with seniority 29th June 1943.

Maj. W. H. Carter, *M.B.* (31402), to be Lt.-Col., 1st Aug. 1945, with seniority 15th Feb. 1945, next above Lt.-Col. W. A. D. Drummond (31405).

Maj. A. Sachs, *M.D.* (36785), to be Lt.-Col., 10th Aug. 1945.

The undermentioned Offrs. holding short service commns. to be Cpts., retaining their present seniority:—

1st Apr. 1945:—

Capt. J. N. Threlfall, *M.B.* (127841).

Capt. J. Duguid, *M.B.* (127660).

6th Apr. 1945:—

Capt. A. D. Young, *D.S.O.*, *M.B.* (128689).

12th Apr. 1945:—

Capt. T. E. Field, *M.B.* (128653).

20th Apr. 1945:—

Capt. D. R. H. Montgomery, *M.C.* (128376).

6th May 1945:—

Capt. I. Macphail, *M.B.* (131322).

10th May 1945:—

Capt. N. D. Lance (133191).

Capt. P. B. Longden (133192).

29th May 1945:—

Capt. D. H. D. Burbridge (135393).

1st June 1945:—

Capt. G. R. Marshall, *D.S.O.* (135685).

2nd June 1945:—

Capt. A. M. Buchanan, *M.B.* (133635).

27th June 1945:—

Capt. G. S. Caithness, *M.B.* (133951).

3rd July 1945:—

Capt. E. J. Bowmer, *M.C.*, *M.B.* (139127).

1st Aug. 1945:—

Capt. H. O. P. McSheehy, *M.C.* (142095).

August 14.—Col. F. D. Annesley, *M.C.* (8422) late R.A.M.C., having attained the age for retirement, is retained on the Active List, supern., 12th Aug. 1945.

Lt.-Col. E. M. Townsend, *M.C.* (27900), from R.A.M.C., to be Col. 12th Aug. 1945, with seniority 5th Nov. 1943.

Lt.-Col. D. Cran, *M.B.* (8630) having attained the age for retirement, is retained on the Active List supern., 12th Aug. 1945.

The undermentioned to be Lt.-Cols. 12th Aug. 1945:—

Maj. W. R. C. Spicer, *M.D.* (36786).

Maj. R. T. P. Tweedy, *M.B.* (36787).

August 21.—Lt.-Gen. Sir A. Hood, *K.C.B.*, *C.B.E.*, *M.D.*, *F.R.C.P.*, *K.H.P.* (18164), late R.A.M.C., Dir.-Gen., Army Med. Servs., on completion of tenure of appt. is retained on the Active List (supern.) 1st Aug. 1945.

September 4.—Maj. (War Subs. Lt.-Col.) J. E. Rea, *M.B.* (1075) to be Lt.-Col., 1st Aug. 1945, with seniority, 4th Oct. 1944, next above Lt.-Col. A. M. Simson, *M.D.* (15747). (Substituted for the notifn. in *Gazette* (Supplement) dated 31st July 1945.)

Maj. G. T. L. Archer, *M.B.* (39082), to be Lt.-Col. 4th Sept. 1945.

Lt.-Col. J. M. MacKenzie, *C.B.E.*, *M.C.*, *M.B.* (14371) having attained the age for retirement, is retained on the Active List supern., 4th Sept. 1945.

September 7.—War Subs. Maj. N. S. Plummer, *M.D.*, *F.R.C.P.* (171205), R.A.M.C., to be a Consultant and is granted the Local Rank of Brig., 29th July 1945.

September 11.—Lt.-Col. S. D. Robertson, *M.B.* (9860), having attained the age for retirement, is retained on the Active List supern., 12th Sept. 1945.

Maj. (War Subs. Lt.-Col.) M. R. Burke, *O.B.E.*, *M.B.* (7304), to be Lt.-Col., 12th Sept. 1945.

Capt. C. P. Stevens, *M.B.E.*, *M.B.* (66479), to be Maj., 22nd Aug. 1945.

Lt. (Qr.-Mr.) (War Subs. Capt. (Qr.-Mr.)) P. A. P. Webberley, *M.B.E.* (99201), to be Capt. (Qr.-Mr.), 9th Sept. 1945.

Lt. (Qr.-Mr.) (War Subs. Capt. (Qr.-Mr.)) J. T. Landau (99203) to be Capt. (Qr.-Mr.), 9th Sept. 1945.

Lt. (Qr.-Mr.) (War Subs. Capt. (Qr.-Mr.)) J. H. Vickers (99203) to be Capt. (Qr.-Mr.), 9th Sept. 1945.

## TERRITORIAL ARMY.

August 10.—Col. (temp. Maj.-Gen.) P. H. Mitchiner, *C.B.*, *C.B.E.*, *T.D.*, *M.D.*, *M.S.*, *F.R.C.S.*, *K.H.S.* (2162) (late R.A.M.C.), to be Maj.-Gen., 11th Apr. 1945.

September 11.—War Subs. Maj. D. J. Campbell, *F.R.C.P.* (56788), to be Maj., 11th Apr. 1945.

War Subs. Capt. T. A. MacGibbon, *M.B.*, *M.R.C.P.* (100161), to be Capt., 11 Apr. 1945.

War Subs. Capt. F. Elliott, *M.B.* (97032), relinquishes his commn. on account of disability, 11th Sept. 1945, and is granted the hon. rank of Maj.

War Subs. Maj. C. F. Critchley, *M.B.* (63129), relinquishes his commn. on account of disability, 12th Sept. 1945, and is granted the hon. rank of Lt.-Col.

## THE ARMY DENTAL CORPS.

September 4.—Capt. B. E. Ffrench (65942) to be Maj., 19th Aug. 1945.

September 11.—Maj. D. J. Isaac (27746) having exceeded the age limit, reverts to ret. pay, 8th Sept. 1945, and is granted the hon. rank of Lt.-Col.



## R.A.M.C. OFFICERS' BENEVOLENT SOCIETY.

## BEQUEST.

The late Major-General H. C. R. Hime, *C.B.*, *D.S.O.*, bequeathed £100 (One Hundred Pounds) to the R.A.M.C. Officers' Benevolent Society.

## AWARDS.

It may be a matter of interest to the Corps that the Military Cross has been awarded to the sons of Major-General O. W. McSheehy, *C.B.*, *D.S.O.*, *O.B.E.*, Major-General W. Brooke Purdon, *D.S.O.*, *O.B.E.*, *M.C.*, and the late Colonel George Delap, *C.M.G.*, *D.S.O.*

Captains McSheehy, *M.C.*, and Peter Delap, *M.C.*, are serving with the Royal Army Medical Corps. Captain C. Brooke Purdon, *M.C.*, belongs to the Royal Ulster Rifles and is Adjutant of the 1st Battalion.

## DEATHS.

**PEARSE.**—On July 20, 1945, Major Albert Pearse, R.A.M.C., Retired. Born in Cheltenham, July 15, 1866, he took the L.R.C.P., and M.R.C.S., London, in 1888 and entered the Service as Surgeon (afterwards Surgeon Captain) Jan. 31, 1891. Promoted Major R.A.M.C. Jan. 31, 1903, he retired Nov. 15, 1911. He took the D.P.H., R.C.P. & S. London, in 1905 and the D.T.M., Liverpool, in 1906. He was re-employed with the Queen's (Royal West Surrey) Regt. Aug. 2, 1914, till Nov. 3, 1914, when his appointment with that unit was cancelled and he returned to the R.A.M.C. He was transferred to the Royal Irish Rifles, April 30, 1915. He relinquished his commission as temporary Major R.I.R., Jan. 7, 1916. In July, 1916, he became Major Royal Defence Force and Staff Captain to Defence Commander No. 2 L. of C., Sept. 1, 1916, to March 31, 1918. He also served with the 10th Service Battalion of the Royal Inniskilling Fusiliers. He served on the North West Frontier of India in 1897–1898 in the Mohmand expedition receiving the Medal with Clasp. In 1899–1900 he served on the Hospital Ship *Princess of Wales* and took part in the operations in the Orange River Colony, being mentioned in despatches and awarded the Queen's Medal with Clasp.

**FAIRRIE.**—In Bournemouth on Sept. 4, 1945, Lieutenant-Colonel Septimus Harold Fairrie, M.B., R.A.M.C., Retired. Born in Everton, Lancs, March 12, 1867, he took the M.B. Manchester, in 1891, and entered the service as Surgeon Lieutenant July 29, 1895. Promoted Captain R.A.M.C. July 29, 1898, Major July 29, 1907, and Lieutenant-Colonel March 1, 1915, he retired July 9, 1919. He served in France from Aug. 14, 1914, till Nov. 13, 1917, and in Mesopotamia from then till May 11, 1919, being awarded the 1914 Star and Clasp, the British War and Victory Medals.

**LATHBURY.**—On Sept. 6, 1945, Lieut.-Colonel Ernest Browning Lathbury, M.D., R.A.M.C.,

Retired. Son of the late Dr. F. R. Lathbury, of Chipperfield, Herts, he was born Oct. 20, 1881. He took the M.D. Brux., in 1906, and entered the Service July 30 the same year as Lieut. R.A.M.C. Promoted Capt. Jan. 30, 1910, Major July 30, 1918, and Lieut.-Colonel Aug. 28, 1930, he retired Nov. 1, 1931. After retirement he took up the appointments of Assistant Medical Officer General Accident Corporation and Commercial Bank of Canada. He rejoined in the rank of Major May 8, 1940, and was relegated to unemployment May 8, 1942. He was the inventor of improvements in or relating to night shooting sights and apparatus. He served in France and Belgium Aug. 15, 1914, till March 26, 1915, and in North Russia Aug. 16, 1919, till Nov. 13, 1919. Mentioned in despatches, he was awarded the *O.B.E.*, 1914 Star and Clasp, British War and Victory Medals.

**McMUNN.**—In Deepcut, Surrey, on Sept. 15, 1945, Major-General James Robert McMunn, *C.B.*, *C.M.G.*, late R.A.M.C., Retired. The son of the late Doctor Samuel McMunn, Ballymote, Co. Sligo, he was born there July 10, 1866. Having taken the L.R.C.P. and L.R.C.S., Ireland, in 1888, he was commissioned Surgeon Lieutenant, July 29, 1943. Promoted Surgeon Captain July 29, 1896, Major R.A.M.C. April 29, 1905, Lieutenant-Colonel March 1, 1915, and Major-General June 3, 1923, he retired July 10, 1926. He was appointed K.H.P. May 1, 1924. He was appointed D.D.M.S., Aldershot Command, July 25, 1923. He served on the North West Frontier of India in the Tirah Expedition 1897–1898, being awarded the Medal with Clasp. He took part in the operations in Cape Colony and Transvaal in 1902, receiving the Queen's Medal with four Clasps. He served in France from Aug., 1914, till Feb., 1918. Twice mentioned in despatches and brought once to notice for valuable services rendered, he was created *C.B.* and *C.M.G.* and received the 1914 Star and Clasp, British War and Victory Medals.

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<b>PROGESTERONE</b>	<p>Indications: Habitual Abortion; Menorrhagia; Functional Uterine Hæmorrhage; Dysmenorrhœa; Toxæmia of Pregnancy.</p> <p>Ampoules: 1.0 mg., 2.0 mg. and 5.0 mg.</p>
<b>"PITOXYLIN" (PITUITARY EXTRACT— POSTERIOR LOBE)</b>	<p>Licensed and standardised in accordance with the Therapeutic Substances Act. For the Induction of Labour; Uterine Inertia; Post Partum Hæmorrhage; Surgical Shock; Diabetes Insipidus.</p> <p>Ampoules: 5, 10 and 20 I.U.</p>
<b>ADRENALIN</b>	<p>Useful for the treatment of Asthma; Epistaxis; Tonsillitis; Hay Fever; Influenzal Crisis; Surgical Shock; etc.</p> <p>Solution: 1 in 100 and 1 in 1000. Ampoules: 1 in 1000.</p>

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# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

## Corps News.

OCTOBER, 1945.

EXTRACTS FROM THE "LONDON GAZETTE." *September 20.*

### HONOURS AND AWARDS.

*September 13, 1945.*

#### C.B.E.

Crosby, T/Brig. G. J. V., *T.D.* (Burma)

#### D.S.O.

Meneces, T/Brig. A. N. T., *C.B.E.* (Burma)

#### O.B.E.

Longden, T/Lt.-Col. P. B. (Burma)

Martin, T/Lt.-Col. A. J. (Burma)

Roberts, T/Lt.-Col. C. E. (Burma)

Tattersall, T/Lt.-Col. R. N. (Burma)

Woods, T/Col. T. F. M. (Burma)

#### M.C.

Beatty, Capt. G. K. (Burma)

Taylor, Capt. T. A. (Burma)

Weir, Capt. J. (Burma)

#### M.B.E.

Campbell, Capt. H. C. (Burma)

Gillespie, Prin. Matron H. S., *R.R.C.*, *Q.A.I.M.N.S.* (Burma)

Gregory, T/Major J. C. (Burma)

Hall, A/Capt. F. E. (Burma)

Langhorne, A/Lt.-Col. D. A. (Burma)

McCrae, T/Major J. S. (Burma)

McWhinney, Capt. R. G. (Burma)

#### B.E.M.

7524901 S/Sjt. I. C. Fisher (Burma)

7388197 Cpl. F. W. Giles (Burma)

#### M.M.

7356762 Pte. F. Hesk ("in the field")

#### MENTIONED.

7517931 Pte. E. C. Barnes ("in the field")

#### R.R.C.

de Mellow, A/Matron E. W., *Q.A.I.M.N.S.* (Burma)

Whale, T/Matron H. E., *A.R.R.C.*, *Q.A.I.M.N.S.* (Burma)

#### A.R.R.C.

Archer, Sister (Mrs.) E. A., *T.A.N.S.* (Burma)

Hopkin, Sister M., *Q.A.I.M.N.S.R.* (Burma)

Miller, Sister E. M., *T.A.N.S.* (Burma)

Moore, Sister C., *Q.A.I.M.N.S.R.* (Burma)

Murison, Sister M. A., *Q.A.I.M.N.S.R.* (Burma)

Smith, Sister E. A., *Q.A.I.M.N.S.* (Burma)

#### C.B.E.

Edwards, Brig. H. C. (Italy)

Inch, T/Col. T. D., *O.B.E.*, *M.C.* (Italy)

#### D.S.O.

Marrable, T/Lt.-Col. A. T. (Arnhem)

#### O.B.E.

Clarke, T/Lt.-Col. W. N. J. (Italy)

Grant, T/Lt.-Col. R. T. (Italy)

MacDougall, T/Lt.-Col. J. A. (Italy)

Taylor, T/Lt.-Col. F. H. (Italy)

Thompson, T/Lt.-Col. A. W. S. (Italy)

Watson, T/Lt.-Col. E. S. (Italy)

Warrack, A/Col. G. M., *D.S.O.* ("in the field")

#### M.B.E.

Crauford-Benson, T/Maj. H. J. (Italy)

Canrass, Capt. I. (Italy)

Hill, Lieut. J. (Italy)

Mallen, T/Maj. K. C. (Italy)

McCrum, Lieut. (Q.M.) J. S. (Italy)

McLean, Capt. J. (Italy)

Mellon, T/Maj. E. R. R. (Italy)

Roberts, W.O.II. J. E., 7349976 (Italy)

Wheeler, T/Maj. F. E. (Italy)

#### M.C.

Evans, Capt. G. R. (Italy)

Howe, Capt. M. S. (Italy)

Evans, T/Maj. F. I. (Burma)

Lipmann-Kessell, Capt. A. W., *M.B.E.* (Arnhem)

#### B.E.M.

Picker, Cpl. H., 7369696 (Italy)

#### D.C.M.

Weatherby, Sjt. J. F., 7357051 (Arnhem)

Couling, A/Cpl. H. R., 7384504 (Arnhem)

#### M.M.

Cahill, Pte. R., 7403879 (Italy)

Coole, Pte. J., 7380948 (Italy)

Hardy, Pte. J., 1556339 ("in the field")

#### MENTIONED.

Alford, T/Lt.-Col. W. C., *O.B.E.* (Arnhem)

Davison, Pte. L., 14315742 ("in the field")

Dobson, Pte. G., 7356259 ("in the field")

Drayson, T/Capt. G. F. H. (killed in action) (Arnhem)

Ellis, L/Cpl. G. V. H., 7361872 (Arnhem)

Gartside, Lt. E. (Defence of Calais)

Green, Cpl. W., 7263618 (Arnhem)

Holmes, Cpl. G., 7357488 (Arnhem)

Jackson, Pte. S. E., 7377856 (Arnhem)  
 Jacobs, Capt. J. (Burma)  
 James, Capt. C. C. M. (Arnhem)  
 Lawson, Capt. J. ("in the field")  
 Mabbott, L/Cpl. E. W., 7364541 (Arnhem)  
 Martin, Capt. V. D. R. (Arnhem)  
 Mason, S/Sjt. H., 7249904 (Arnhem)  
 Stubbs, Lieut. F. S. (Defence of Calais)

#### A.R.R.C.

Clutton, Sister P., Q.A.I.M.N.S.  
 Ray, Sister M., Q.A.I.M.N.S.

September 27.

#### MENTIONED ("in the field")

Stuppell, T/Maj. R. (died of wounds)  
 Walker, Pte. J., 7360329 (killed in action)

#### MENTIONED (Burma)

Macnamara, T/Col. J. P.  
 Croot, T/Lt.-Col. H. J.  
 Hay-Shunker, T/Lt.-Col. C. L.  
 Heslop, T/Lt.-Col. J. F.  
 Langford, T/Lt.-Col. R. C.  
 Owen, T/Lt.-Col. J. R.  
 McIntosh, A/Lt.-Col. J. M.  
 Greig, Maj. G. W.  
 Ashley, T/Maj. G. T.  
 Brown, T/Maj. J.  
 Clow, T/Maj. J. M., M.B.E.  
 Collin, T/Maj. J. O.  
 Henderson, T/Maj. T. E.  
 Hood, T/Maj. E. L. O.  
 Hoskyn, T/Maj. C. H.  
 Keys, T/Maj. G. J. G.  
 MacCallum, T/Maj. J. D.  
 O'Callaghan, T/Maj. W.  
 Wolstenholme, T/Maj. W. H..  
 Howat, A/Maj. T. K.  
 Abraham, Capt. G. M.  
 Burnley-Jones, Capt. N. C.  
 Caturani, Capt. M.  
 Forrest, Capt. R. G.  
 Great-Rex, Capt. J. B.  
 Hampshire, Capt. J. K.  
 Harris, Capt. J.  
 Harrison, Capt. T. B.  
 Hughes, Capt. M. H.  
 Kilgour, Capt. G.  
 Kreiser, Capt. H. A.  
 McCullough, Capt. J. K. H.  
 Nankivell, Capt. P. H.  
 Rado, Capt. B.

Rees, Capt. J. H.  
 Tibbetts, Capt. R. W.  
 Walker, Capt. W. T.  
 Whitmore, Capt. G. L.  
 McLean, T/Capt. J. M.  
 McPherson, T/Capt. J. A.  
 Schilling, T/Capt. (Qr.-Mr.) F. G.  
 Strain, T/Capt. (Qr.-Mr.) R.  
 Fine, W.O.II, H., 7524077  
 Holland, W.O.II, F. J., 7261995  
 Cobain, A/W.O.II, J., 7521544  
 Harvey, A/W.O.II, G. H., 7346391  
 Burman, S/Sjt. J. G., 7516649  
 Goffin, S/Sjt. S. C. J., 7522910  
 Joyce, S/Sjt. J. E., 7345030  
 Mitchell, Sjt. D. M. F., 7533573  
 Rappold, Sjt. F., 7399178  
 Coote, Lce.-Sjt. V., 7525040  
 Berkshire, Capt. J. T., 14229843  
 Boocock, Cpl. R. H., 7380629  
 Cook, Cpl. F., 7381837  
 Heslop, Cpl. J. R., 7521220  
 Martin, Cpl. V., 7363892  
 O'Donnell, Cpl. R. P. B., 7360952  
 Rodgers, Cpl. R. J., 7385376  
 Clements, A/Cpl. A. F., 7360394  
 Halliday, Lce.-Cpl. C. H., 7379286  
 Halliday, Lce.-Cpl. G. O., 7379287  
 Maclure, Lce.-Cpl. H., 7534251  
 Mellor, Lce.-Cpl. G. W., 7383625  
 Basebe, Pte. C. D., 7406134  
 Carpenter, Pte. H. G. T., 7534415  
 De Coene, Pte. J. W., 7381976  
 Devar, Pte. G. A., 7534342  
 Gibson, Pte. J. H., 7358276  
 Gilbert, Pte. A. P., 7533290  
 Mann, Pte. M., 1140939  
 Mackenzie, Capt. D. B., The Army Dental Corps  
 O'Connor, A/Matron M. E., A.R.R.C., Q.A.I.M.N.S.  
 Weallens, A/Matron Mrs. M. M. A. M., Q.A.I.M.N.S.  
 Bowcock, A/Asst. Matron H. H., Q.A.I.M.N.S.  
 Coleman, Sister M., Q.A.I.M.N.S.  
 Genge, Sister M. E., Q.A.I.M.N.S.  
 Stewart, Sister E., Q.A.I.M.N.S.  
 Yates, Sister M. E., T.A.N.S.

October 4.—The Awards of Mentions-in-Despatches to the following, which were announced in the *London Gazette* (No. 37051), dated 26th April, 1945, are cancelled; higher awards having been conferred on the individuals concerned for the same services and announced in the *London Gazette* (No. 37262), dated 13th September 1945:—

Maj. (temp.) J. S. McCrae, M.B. (199332).  
 Capt. (temp.) T. A. Taylor, M.B. (171197).

### TERRITORIAL ARMY.

September 14.—Lt. (Qr.-Mr.) (War Subs. Capt. (Qr.-Mr.) G. H. Thynne (99207) to be Capt. (Qr.-Mr.), 9th Sept. 1945.

September 18.—The undermentioned War Subs. Maj.s. to be Maj.s., 11th Apr. 1945:—  
 E. F. Baines (28888)  
 F. S. Mitchell-Heggs (63418)  
 R. W. Nevin, M.B., F.R.C.S. (63953)

September 18.—Maj. J. H. Anderson (38180) to be Lt.-Col. 18th Sept. 1945.

Lt.-Col. H. R. Sheppard, C.B.E. (9369), having attained the age for retirement, is retained on the Active List supern., 18th Sept. 1945.

September 21.—Lt.-Col. W. H. A. D. Sutton, O.B.E. (5041), having attained the age for retire-

ment, is retained on the Active List supern., 22nd Sept. 1945.

Maj. E. S. Tweedy, M.B. (53065), relinquishes his commn. on account of disability, 22nd Sept. 1945, and is granted the hon. rank of Lt.-Col.

September 25.—Col. E. A. Brock (8569), late R.A.M.C., on completion of four years in the rank, is retained on the Active List supern., 24th Sept. 1945.

Lt.-Col. K. P. Mackenzie, M.B. (14221), from R.A.M.C., to be Col., 24th Sept. 1945, with seniority, 21st Nov. 1939, next above Col. W. Foot, M.C., M.B. (15373), late R.A.M.C., and is restored to the establishment, 24th Sept. 1945.

Maj. (War Subs. Lt.-Col.) W. G. S. Foster (37601) to be Lt.-Col. 24th Sept. 1945.

October 2.—Capt. (Qr.-Mr.) F. H. Newland (63666) to be Maj. (Qr.-Mr.), 2nd Oct. 1945.

## THE ARMY DENTAL CORPS.

September 18.—Capt. W. B. Hubbard (100708) from short service commn., is appt. to a permanent commn., 17th Sept. 1945.

September 21.—Col. H. L. McCallum (10654) late A.D. Corps, having exceeded the age for retirement, retires on ret. pay, 21st Sept. 1945.

## DEATHS.

WEBB.—In High Coombe, Balcombe, Sussex, on October 7, 1945, Colonel Sir Lisle Webb, K.B.E., C.B., C.M.G., late R.A.M.C., Retired. Born in Brixton July 19, 1871, he took the L.R.C.P., and M.R.C.S., London, in 1895, followed by the D.P.H. in 1907 and the D.T.M. & H. in the same year. Commissioned Lieutenant R.A.M.C. July 27, 1899, he was promoted Captain July 27, 1902, Major January 28, 1911, Lieutenant-Colonel March 1, 1915, Brevet Colonel June 3, 1918, and retired January 31, 1922. In 1910 he was thanked by the Anti-Typhoid Committee for valuable co-operation in prolonged and difficult scientific experiments. He was Director-General, Medical Services, Ministry of Pensions, from 1919 till 1933. He was also Hon. Consulting Physician, Ministry of Pensions, and an Hon. Fellow of University College. In South Africa 1899–1902, he took part in the action at Colesberg, Relief of Kimberley, Operations at Paardeberg, actions at Poplar Grove, Karee Siding, and Zand River. Actions near Pretoria and Diamond Hill. Action at Elands River. Actions at Wittebergen. He received the Queen's Medal with five Clasps, and the King's Medal with two Clasps. He served in France from October 20, 1914, till April, 1916. Twice mentioned in despatches, and brought to notice for valuable services rendered, he was

created C.M.G. in 1915, C.B. in 1919, and received the Brevet of Colonel, 1914 Star, British War and Victory Medals. He was created Knight of Grace of the Order of St. John in 1919 and K.B.E. in 1920.

SMITH.—In Cheltenham on October 8, 1945, Colonel Lionel Fergus Smith, C.M.G., M.B., late R.A.M.C., Retired. Son of W. Smith, he was born in Ballinoma, Co. Cork, December 13, 1869, and educated at the High School, Dublin, and T.C.D., where he obtained an Erasmus Smith Exhibition, and honours in Classics, Logic, Modern Literature and Modern History. Having taken the M.B. in 1894, he entered the Service as Surgeon Lieutenant July 29, 1895. Promoted Surgeon Captain July 29, 1898, Major R.A.M.C. January 29, 1907, Lieutenant-Colonel March 1, 1915, and Colonel December 26, 1921, he retired December 26, 1925. He served on the North-West Frontier of India in 1897–1898, receiving the Medal with Clasp. He served with the Aden Field Force in July and August, 1915, and in Macedonia from November, 1915, till January, 1919. Thrice mentioned in despatches, he was created C.M.G., and received the 1914–15 Star, British War and Victory Medals. He took the D.P.H., Dublin, in 1905 and was Honorary Surgeon to the Viceroy of India in 1925.

# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

## Corps News.

NOVEMBER, 1945.

FROM THE "LONDON GAZETTE"  
of October 11, 1945.

### HONOURS AND AWARDS.

#### C.B.E.

Bearn, T/Col. F. A., *D.S.O.*, *M.C.* (N.W. Europe)  
Bulmer, L./Brig. E., *O.B.E.* (N.W. Europe)  
McConkey, A/Brig. J. T. (N.W. Europe)

#### D.S.O.

Gonin, T/Lt.-Col. M. W. (N.W. Europe)

#### O.B.E.

Anderson, T/Lt.-Col. J. C. (N.W. Europe)  
Copeman, T/Lt.-Col. W. S. C. (N.W. Europe)  
Douglas, A/Col. J. P., *M.B.E.* (N.W. Europe)  
Evans, T/Lt.-Col. R. (N.W. Europe)  
Flood, Col. F. G., *M.C.* (N.W. Europe)  
Foster, T/Lt.-Col. F. N., *T.D.* (N.W. Europe)  
Hutcheon, T/Lt.-Col. E. (N.W. Europe)  
Jenkins, T/Col. J. P. J., *T.D.* (N.W. Europe)  
Kerr, T/Lt.-Col. A. B., *T.D.* (N.W. Europe)  
Knott, T/Col. H. E. (N.W. Europe)  
Logan, T/Lt.-Col. W. R., *T.D.* (N.W. Europe)  
Richardson, A/Col. F. McL., *D.S.O.* (N.W. Europe)  
Shaw, Col. R. G., *M.C.* (N.W. Europe)  
Talbot, T/Col. G. G., *T.D.* (N.W. Europe)

#### M.B.E.

Allwright, W.O.I E. W., No. 7343801 (N.W. Europe)  
Baigent, W.O.I C. H., No. 7262244 (N.W. Europe)  
Basant, Sister Lily, *T.A.N.S.* (N.W. Europe)  
Buchanan, A/Lt.-Col. W. E. A., *T.D.* (in the field)  
Burrow, Capt. K. C. (N.W. Europe)  
Finlayson, A/Maj. J. D. (in the field)  
Heaney, W.O.I J. A., No. 7260303 (N.W. Europe)  
Hooper, W.O.II P. B., No. 7348402 (N.W. Europe)  
Hunter, Maj. R. B. (N.W. Europe)  
Johnson, T/Maj. D. J. (N.W. Europe)  
Jolly, T/Maj. (Q.M.) W. J. (N.W. Europe)  
Kinnear, Maj. W. L. (in the field)  
Lusk, Sister H. J. R., *T.A.N.S.* (N.W. Europe)  
Mackay, T/Lt.-Col. J. C., *M.C.*, *T.D.* (in the field)  
Michie, T/Maj. W. (N.W. Europe)  
Murray, T/Maj. R. O. (N.W. Europe)  
Norman, T/Maj. R. O. G. (N.W. Europe)  
Sumner, Lieut. (Q.M.) J. F. (N.W. Europe)

#### M.C.

Burns, Capt. J. (in the field)  
Chisnall, T/Maj. J. L. (N.W. Europe)  
Jack, Capt. R. D. S. (N.W. Europe)

Mackay, Lieut. R. (in the field)  
Macrae, Lieut. D. J. (in the field)  
Major, Lieut. R. W. (N.W. Europe)  
McQuitty, Capt. G. D. H. (N.W. Europe)  
Morris, Capt. I. (N.W. Europe)  
Plant, Lieut. F. W. M. (in the field)  
Sheehan, Capt. J. (N.W. Europe)  
Stoker, Lieut. G. E. (in the field)

#### B.E.M.

Price, Lce-Cpl. A. W., No. 7374746 (N.W. Europe)  
Taylor, Cpl. V. E., No. 7359325 (N.W. Europe)  
Waterman, Sjt. A. L., No. 7348421 (N.W. Europe)

#### M.M.

Cantor, Cpl. A., No. 7519722 (N.W. Europe)  
Bailey, Lce-Cpl. D. D., No. 14523336 (N.W. Europe)  
Long, Lce-Cpl. W. S., No. 7375034 (N.W. Europe)  
Hitchcock, Pte. G. A., No. 7349503 (N.W. Europe)  
Kent, Pte. F. G., No. 7391517 (N.W. Europe)  
Thomson, W.O.I T. B., No. 7339389 (in the field)  
Hill, S/Sjt. J., No. 7340356 (in the field)  
Sanderson, Sjt. G. McG., No. 2749460 (in the field)

#### MENTIONED.

*R.A.M.C.* (in the field)

Imrie, T.Maj. C. H.  
Morrissey, Capt. J. (killed in action)  
Taylor-Smith, T/Capt. A.  
Darke, Lieut. G. H.  
Hay, S/Sjt. W., 7340068  
Anderson, Cpl. W., 7346908  
Moore, Pte. D., 7346892

*The Army Dental Corps.*

Lancaster, L/Sjt. W., 7536102

#### THE ROYAL RED CROSS (N.W. Europe)

*Q.A.I.M.N.S.*

#### Bar to R.R.C.

Wade, A/P. Matron S. A. W., *R.R.C.*

#### R.R.C.

Delves, A/S. Sister A. M.  
Joynt, A/Matron E. W., *A.R.R.C.*  
Roberts, S.Sister A., *A.R.R.C.*

#### A.R.R.C.

Phillips, S.Sister K. E.  
Ray, A/S.Sister G. S.  
Brims, Sister J. F. M.  
Jones, Sister G.  
Woolsey, S.Sister A. E.

Bath, Sister V. M.  
 Boyd, Sister J. A.  
 Ellis, Sister P. E. M.  
 Evans, Sister E. B. V.  
 Gray, Sister F.  
 Holmes, Sister O.  
 Hooper, Sister I. A.  
 Hughes, Sister E. M.  
 Jones, Sister E.  
 Luker, Sister E. H. A.  
 McCrum, Sister M. I.  
 Mitchell, Sister I. E. M.  
 Moss, Sister L.  
 Pearce, Sister F.  
 Robinson, Sister L. S.  
 Stutter, Sister M.  
 Tolaud, Sister S. E.  
 Triffitt, Sister A. I.  
 Watkins, Sister B. P. G.  
 White, Sister S. E.

## T.A.N.S.

Borrow, S. Sister A. C.  
 Burras, A/S. Sister E. I.  
 Coghlan, A/S. Sister C. A.  
 Court, A/S. Sister C. M. W.  
 Bowen, Sister M. A.  
 Clatworthy, Sister E. N.  
 Farley, Sister E. F. A.  
 Hammond, Sister E. M.  
 Haslett, Sister A.  
 Jackson, Sister E. J.  
 Kelly, Sister L. E. M.  
 Kitching, Sister F.  
 Laing, Sister I. B. M.  
 McCondach, Sister E.  
 Morrison, Sister J.  
 Ogilvie, Sister J. M. L.  
 Parry, Sister E. J.  
 Reid, Sister M.  
 Shillito, Sister N.  
 Silvester, Sister E. E.  
 Snodden, Sister M.  
 Urquhart, Sister E. W.  
 Waiton, Sister F. E.

October 18.—The KING has been graciously pleased to give orders for the following appointments to the Most Excellent Order of the British Empire, in recognition of distinguished services during the liberation of prisoners in German Concentrated Camps:—

## O.B.E.

Fiddes, A/Lt.-Col. F. S.  
 Johnston, T/Lt.-Col. J. A. D., M.C.  
 Lipscomb, Lt.-Col. F. M.

## M.B.E.

Higginbotham, Sister B. L., Q.A.I.M.N.S.  
 O'Donnell, Capt. P.  
 Peterkin, Capt. D. B.

## MENTIONED.

## Royal Army Medical Corps.

Tuck, Maj. H. A.  
 Griffin, T/Maj. E. M.  
 Smith, T/Maj. G. M. C.  
 Waterston, T/Maj. D. J., M.B.E.  
 Baker, Capt. G. M.  
 Gluck, Capt. I.

Kraus, Capt. J.  
 Prescott, Capt. D. T.  
 Winterbottom, Capt. W. C.  
 Durrant, Lieut. S.  
 Winter, Lieut. N.  
 Cobbledick, Lieut. (Qr.-Mr.) W. H.  
 Jackman, Lieut. (Qr.-Mr.) J. F.  
 Harford, W.O.I J., 7258707  
 Crowe, A/W.O.I S., B.E.M., 7258056  
 McCorquodale, S/Sjt. A., 7266251  
 Rains, S/Sjt. H., 7520952  
 Clarke, Sjt. H. A., 7523575  
 Goodwin, Sjt. J., 7384484  
 Morrhouse, Sjt. J. A., 7348399  
 Bluston, Cpl. D., 7384034  
 Egleton, Cpl. S. P., 7345305  
 Pocock, Cpl. P. J. H., 7265409  
 Collin, Pte. E. P. V., 7516981

## The Army Dental Corps.

Wood, Capt. B. G.  
 Galvin, Cpl. C., 7538610

## Q.A.I.M.N.S.

Cameron, Sister B. S.  
 Jordan, Sister T.  
 Kinsella, Sister N. M., M.B.E.  
 Lovett, Sister M. K. E.  
 Sapsford, Sister J.

## T.A.N.S.

Thomas, Sister G. M.

October 25.

M.M.

Cooper, Cpl. J. W., No. 5383014

## MENTIONED ("in the field")

Lawson, Capt. J. G.

November 1.

## M.B.E. ("while Prisoner of War")

Charters, T/Major D. L.

## MENTIONED ("while Prisoners of War")

Longmuir, S/Sjt. A., 7338046  
 Jones, Sjt. E. W., 7261809  
 Rowley, Sjt. W. E., 3704964  
 Canovan, Pte. A. E., 7264616  
 Evans, Pte. L., 7396429  
 Fannen, Pte. W. H., 7266799  
 Fraser, Pte. J. J., 7357797  
 Grant, Pte. F. A., 7356977  
 Gunn, Pte. R., 3311878  
 Palmer, Pte. T., 7356806  
 Plucknett, Pte. W. C., 7261069  
 Walker, Pte. J., 7360329 (killed in action)

## ("in the field")

Adkins, A/Cpl. W. J., M.M., 7261180

October 12.—Lt.-Col. G. H. Haines, M.C. (23239) from R.A.M.C. to be Col., 13th Oct. 1945, with seniority 1st July 1942.

Col. C. D. M. Buckley, M.C., M.B. (22509), late R.A.M.C., on completion of four years in the rank, is retained on the Active List (supern.), 13th Oct. 1945.

Col. (temp. Maj.-Gen.) J. G. Gill, C.B.E., D.S.O., M.C., M.B. (8368), late R.A.M.C., relinquishes the temp. rank of Maj.-Gen., 26th Apr. 1945.

October 16.—Maj. J. E. M. Boyd (5239) ret. pay, R.A.M.C., is restored to the rank of Lt.-Col., 16th Aug. 1945, on ceasing to be employed, and is granted the hon. rank of Col.

October 23.—Col. (temp. Maj.-Gen.) J. C. A. Dowse, C.B.E., M.C., M.B. (8626), late R.A.M.C., on completion of four years in the rank, is retained on the active list (supern.), 21st Oct. 1945.

Lt.-Col. F. McKibbin, O.B.E., M.B. (8445), from R.A.M.C., to be Col., 21st Oct. 1945, with seniority 8th Dec. 1943.

October 26.—Maj.-Gen. Sir Percy S. Tomlinson, K.B.E., C.B., D.S.O., F.R.C.P., ret. pay, is apptd. Col.-Comdt., 27th Aug. 1945, vice Maj.-Gen. J. W. West, C.B., C.M.G., C.B.E., LL.D., M.B., M.Ch., ret. pay, who has attained the age limit for the appt.

Lt.-Col. E. L. F. Nash, M.C., M.B. (8724),

retires on account of disability, 25th Oct. 1945, retaining the rank of Lt.-Col.

October 30.—Maj.-Gen. A. G. Biggam, C.B., O.B.E., M.D., F.R.C.P., K.H.P. (14900) late R.A.M.C., is retained on the active list supern., 29th Oct. 1945.

Col. H. B. F. Dixon, M.C., M.D., F.R.C.P. (10659), late R.A.M.C., on completion of four years in the rank, is retained on the active list supern., 29th Oct. 1945.

War Subs. Capt. Robert Sherrard McClelland, M.B. (236343) from R.A.M.C. (Emerg. Comm.) is granted a short service comm., in the rank of Lt., 11th July 1942, and to be Capt., 11th July 1943, with seniority next below Capt. J. D. McDorey.

Maj. W. Duguid, M.B. (38758), relinquishes his commn., 27th Aug. 1945, and is granted the hon. rank of Maj.

## REGULAR ARMY RESERVE OF OFFICERS.

October 12.—Col. A. D. Stirling, D.S.O., M.B. (4623), late R.A.M.C., reverts to ret. pay, 11th

June 1945, on ceasing to be employed, and is granted the hon. rank of Brig.

## THE ARMY DENTAL CORPS.

October 26.—Maj. S. A. Rodda (27139) reverts to ret. pay on ceasing to be employed on account of

disability, 25th Oct. 1945, and is restored to the rank of Lt.-Col.

## AWARDS.

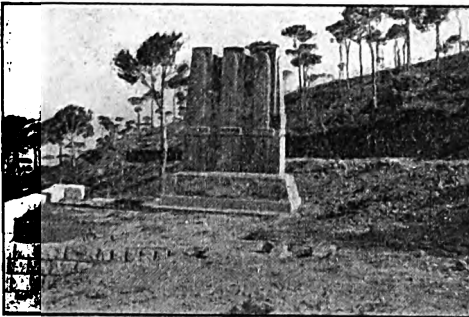
Following a notice in our September issue on the award of decorations to the sons of certain officers late R.A.M.C., we have received news of the following awards made to Major W. G. F. Jackson, R.E. the son of Colonel A. Jackson.

Major Jackson was awarded the Military Cross for work in the Norwegian campaign, and earned a bar to his M.C. at Casino. He was also Mentioned in despatches for work in Italy.

## NORMAN VEITCH LOTHIAN

M.B., B.SC., D.P.M., D.P.H., D.T.M.&H.

Five times mentioned in despatches, Brevet Major, M.C., French War Cross, 1914 Star and Clasp. B.W.M. and V.M.



As a result of a motor accident on a road in the hills to the East of Beyrout in Syria, close to Beit Amara, there died, in 1925, that very gallant gentleman, Norman Lothian.

Many friends may be glad to see this photograph of his memorial, on the site of the tragedy, taken by Brigadier John Sinton in 1944.

Lothian after an outstanding career in the R.A.M.C., became Secretary to the Medical Directorate of the League of Nations. It was while on an inspection of the malaria problems in Syria and Palestine that the fatal accident occurred. Realizing all too well that he had an internal hæmorrhage he refused all aid saying "You can do nothing for me—look after the ones you can help," and so died one of the keenest intelligences we ever had in our Corps. A man of unusual charming and modest personality, who entered with zest into all sides of life, he still lives in the memory of those who were privileged to know him.

## Erratum.

CORPS NEWS, October, 1945, page 13—

With the exception of Majors E. F. Baines, F. S. Mitchell-Heggs and R. W. Nevin, the names shown under TERRITORIAL ARMY are Regular Army Officers.



## DEATHS.

**STORRS.**—On October 9, 1945, in Teddington, Middlesex, Lieutenant-Colonel Reginald Storrs, R.A.M.C., Retired. Born March 11, 1875, he took the L.R.C.P. and L.R.C.S. Edinburgh, and the L.R.F.P.S. Glasgow, in 1898. Having served as a Civil Surgeon from January till August, 1902, he was gazetted Lieutenant R.A.M.C. September 1, 1902. Promoted Captain March 1, 1906, Major June 1, 1914, and Lieutenant-Colonel August 31, 1924, he retired March 11, 1930. He served in France and Belgium from August 18, 1914, till March 14, 1919. He was mentioned in despatches and awarded the 1914 Star and Clasp, British War and Victory Medals.

**GILKES.**—The death of Lieutenant-Colonel Humphrey Arthur Gilkes, M.C., M.D., in an air crash is reported in the *British Medical Journal*. Born in Dulwich October 13, 1895, he served in the ranks of the Honourable Artillery Company from September, 1914, till September, 1915, when he was commissioned 2/Lieutenant 21 Battalion London Regt. (T.F.). Promoted T/Lieutenant July 1, 1916, and Lieutenant July 1, 1917, he was demobilized January 4, 1919. He was appointed Lieutenant T.F. Reserve January 4, 1919. He took the M.B.Oxon. in 1922 and was appointed Lieutenant R.A.M.C. February 1, 1923. He resigned in November the same year. He took the M.A., M.D.Oxon. and the D.T.M. & H. Eng. in 1928. He subsequently was Medical Officer Northern Rhodesian Medical Service and eventually D.D.M.S. Trinidad. He held an emergency commission in the R.A.M.C. in February and March, 1940. He served in France and Belgium from December, 1914, till September, 1915, May 28, 1916, to March 25, 1918, and from July 19, 1918, till end of the war. He was wounded and in addition to the 1914-15 Star, British War and Victory Medals, he was awarded the M.C. and three Bars. The M.C. was awarded for conspicuous gallantry and devotion to duty as Battalion Intelligence and Signalling Officer. He made repeated reconnaissances under heavy fire, gaining valuable information and maintaining efficient communication throughout a period of several days. *L.G.* September 17, 1917.

The first Bar to the M.C. was awarded for con-

spicuous gallantry and devotion to duty. He led a patrol to a strong point 500 yards in advance of our line to discover whether it was occupied by the enemy. Finding it unoccupied, he set fire to the dug-out and blew up a store of bombs and ammunition. *L.G.* March 4, 1918, and August 16, 1918.

Second Bar to the M.C. was awarded for conspicuous gallantry and devotion to duty. Accompanied by an N.C.O., he entered the enemy's advanced line and captured four prisoners. On the following day he reconnoitred the ground in advance of the line for over 1,500 yards, and discovered the enemy's dispositions. Later he reconnoitred over 2,000 yards of the front and obtained valuable information as to the enemy's movements. On the same day, when the situation was very obscure, he entered a village, which was held by the enemy, reconnoitred it, and brought back valuable information. He showed magnificent daring and skill. *L.G.* June 22, 1918.

Third Bar to the M.C. was awarded for conspicuous gallantry at Moislains on September 2, 1918. When an attack had partially failed, and the situation had become obscure, he made repeated reconnaissances through a very heavy barrage, and over ground swept by machine-gun fire, regardless of his own safety, and it was owing to his accurate reports that timely action was taken to restore a critical situation. His courage and resource was most marked. *L.G.* February 1, 1919.

The following is from the *B.M.J.* of October 6, 1945 :—

In the recent war, after serving with a field ambulance during the advance into the Somalilands and Ethiopia, he was sent to Somalia (the former Italian Somaliland) as A.D.M.S. There he laid the foundations of the civil medical services during a peculiarly difficult time. He (writes T. S. E.) was an outstanding personality and steadfast believer in the potentialities of the Somali peoples. He was single-mindedly determined throughout the nearly five years he served in Somali countries that the Somali should have a square deal, and particularly that they should have a good medical service.



AT no time in all history was there a more zealous, impassioned ecclesiastic than St. Dunstan of Avalon. Never has the Devil had a more redoubtable antagonist. Who has not read the story of St. Dunstan's encounter with the forces of evil on that memorable occasion when, so it is said, he gripped a pair of red-hot tongs and seized his arch-enemy by the nose.

Born at Glastonbury more than a thousand years ago, Dunstan was one of the most versatile men of his day. Not only was he a great archbishop and statesman, he was also an artist, calligraphist, musician, and composer of outstanding ability.

Among his many accomplishments he displayed undoubted talent as a craftsman in gold and silver. "He was"—to quote an old inscription—"very well skill'd in refining metals and forging them," and it was for this reason he was chosen as patron saint of goldsmiths.

Although Dunstan was admittedly ambitious and something of an autocrat, historians are agreed that he was a great patriot and that his seemingly insidious scheming for personal advancement was generally at the expense of the foreign faction which, at that time, wielded considerable power in the country.

Certainly he was endowed with the crusading spirit; a spirit that has through many generations inspired his fellow countrymen to deeds of self-sacrifice and heroism. A spirit that still burns in the hearts of men in the present struggle against the forces of evil.

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# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS

## Corps News.

DECEMBER, 1945.

EXTRACTS FROM "THE LONDON GAZETTE."

### HONOURS AND AWARDS.

November 8, 1945.

**M.C.**

Caraher, Capt. E. F. M. (" in the field ").  
Egan, Lieut. M. A. (" in the field ").  
Prosser, T/Maj. O. G. (" in the field ").  
Thomson, Capt. A. C. P. D. (" in the field ").

### MENTIONED.

Macaulay, Capt. D. R. (" in the field ").

### MENTIONED.

(N.W. Europe)

Wallace, T/Brig. Q. V. B., *C.B.E.*, *M.C.*  
Porritt, T/Brig. A. E., *C.B.E.*  
Fulton, A/Brig. G. K., *M.B.E.*  
Fletcher-Barrett, T/Col. K., *O.B.E.*  
Rutherford, T/Col. R., *T.D.*  
Paton, T/Col. I. A. M., *O.B.E.*  
Mitchell-Heggs, Lt.-Col. G. B., *O.B.E.*  
Caird, T/Lt.-Col. J. C.  
Chesser, T/Lt.-Col. S. J., *M.B.E.*  
Clarke, T/Lt.-Col. P. J. H.  
Crozier, T/Lt.-Col. T. H.  
Jack, T/Lt.-Col. E. A., *O.B.E.*  
Myles, T/Lt.-Col. R. B., *O.B.E.*  
Power, T/Lt.-Col. R. W., *T.D.*  
Saunders, T/Lt.-Col. K. G. W.  
Evans, A/Lt.-Col. R. G., *M.B.E.*  
Kelleher, Maj. J. S.  
Acheson, T/Maj. P. M.  
Borland, T/Maj. A. K., *M.B.E.*  
Buchanan, T/Maj. D. S.  
Charles, T/Maj. G. P.  
Cooper, T/Maj. A. E., *M.C.*  
Donald, T/Maj. A. B.  
Forbes, T/Maj. G. B.  
Hobson, T/Maj. W.  
Lancaster, T/Maj. J. S., *M.C.*  
Linacre, T/Maj. J. L.  
Mann, T/Maj. B. T.  
Moore, T/Maj. E. H.  
Murphy, T/Maj. J. F. D.  
Nicholson, T/Maj. W. A. B.  
Ormrod, T/Maj. R. F. G.  
Risley, T/Maj. T. G.  
Ross, T/Maj. T. D.  
Ross, T/Maj. W. C.  
Semple, T/Maj. J. E.  
Sills, T/Maj. (Qr.-Mr.) A.  
Stewart, T/Maj. K. D., *M.B.E.*  
Valentine, T/Maj. G. F.  
Kirton-Vaughan, T/Maj. A. W. J.

Wevill, T/Maj. L. B.  
Zabokrzycki, T/Maj. J. M.  
Alban-Jones, A/Maj. D. J. A.  
Black, A/Maj. T.  
Mossendew, A/Maj. N. A.  
Blair, Capt. G. L. McC.  
Booth, Capt. J.  
Callander, Capt. E. M.  
Chazen, Capt. S. H.  
Coles, Capt. R. B.  
Crawshaw, Capt. E. G. A.  
Farquhar, Capt. J. B.  
Hall, Capt. R. W. L.  
Harrison, Capt. E. B.  
Hebbert, Capt. F. J.  
Luker, Capt. B. C. H.  
MacDonald, Capt. B. W.  
MacRae, Capt. J. S.  
O'Dwyer, Capt. J. S.  
Russell, Capt. J. Y. W.  
Rymer, Capt. K. E.  
Slater, Capt. J.  
Sunderland, Capt. R. S.  
Young, Capt. H. B.  
Burnett, Lt. (Qr.-Mr.) T. H.  
Brownsey, Lt. W.  
Hann, Lt. P. A.  
Holley, Lt. P. F.  
Jones, Lt. D. G.  
Searle, Lt. J. G.  
Tizard, Lt. J. K.  
Todd, Lt. (Qr.-Mr.) A.  
2871132 W.O.I. D. G. King.  
7342780 W.O.I. S. H. Mitchell.  
7262138 W.O.I. W. E. Penney.  
7381924 W.O.II. A. H. D. Brownlee.  
7388730 W.O.II. L. F. W. Chivers.  
2023507 W.O.II. J. A. Dipple.  
7522763 W.O.II. J. Evans.  
7367110 W.O.II. V. A. H. Filtness.  
7517905 W.O.II. V. Harper.  
7388291 W.O.II. R. V. Hesketh.  
7257655 W.O.II. H. L. Morris.  
7360359 W.O.II. A. W. Urquhart.  
7249239 W.O.II. W. G. Whitnell.  
7358046 S.Sgt. W. L. Andrews.  
7371734 S.Sgt. K. O. Batten.  
7359120 S.Sgt. A. D. Brown.  
7523962 S.Sgt. A. Clarkson.  
7516743 S.Sgt. W. H. Davies.  
7523238 S.Sgt. A. G. Eager.  
7344462 S.Sgt. F. C. Gagg.  
7262008 S.Sgt. F. T. Gittus.  
7522654 S.Sgt. J. L. James.  
7261978 S.Sgt. V. W. Matthews.

7371750 S.Sgt. J. W. F. Mayo.  
 7011852 S.Sgt. J. T. McCoy.  
 7341993 S.Sgt. W. H. Owen.  
 7522166 S.Sgt. (actg.) W. J. Reid.  
 7263958 Sgt. H. M. Bishop.  
 7349973 Sgt. M. E. Bowler.  
 7523783 Sgt. E. P. Casserly.  
 7520662 Sgt. J. Crossby.  
 7354828 Sgt. F. G. Davis.  
 7379125 Sgt. C. F. Garland.  
 7356069 Sgt. R. C. W. S. Hood.  
 7359480 Sgt. M. Kennedy.  
 7358843 Sgt. C. J. Lewis.  
 7359601 Sgt. R. Marshall.  
 7356980 Sgt. W. H. M. Mitchell.  
 7397075 Sgt. E. W. Peckett.  
 7360405 Sgt. F. Pickering.  
 7628989 Sgt. H. Smith.  
 7348543 Sgt. M. H. Sones.  
 7362568 Sgt. R. G. Sykes.  
 7368449 Sgt. A. V. Thornton.  
 7386738 Cpl. G. E. Booth.  
 7383136 Cpl. T. Kearney.  
 7387401 Cpl. D. Lane.  
 7385160 Cpl. J. G. Murdon.  
 7385296 Cpl. T. A. Reading.  
 7357106 Cpl. A. L. Segar.  
 7367836 Lce.-Cpl. L. Brooks.  
 7379814 Lce.-Cpl. R. A. Charles.  
 7391359 Lce.-Cpl. T. G. Cole.  
 7371320 Lce.-Cpl. H. A. George.  
 7360153 Lce.-Cpl. I. Jones.  
 14536061 Lce.-Cpl. F. J. Slater.  
 7379346 Lce.-Cpl. C. E. Ward.  
 7381011 Pte. M. A. Bancroft.  
 7362519 Pte. F. V. Brown.  
 7401891 Pte. J. C. Carrick.  
 7266908 Pte. H. W. T. Chambers.  
 7403812 Pte. W. S. G. Davies.  
 7385456 Pte. T. A. Doolan.  
 9705977 Pte. T. Downey.  
 14577377 Pte. W. L. Evans.  
 14616617 Pte. D. McCabe.  
 1835221 Pte. G. F. McCleary.  
 14674306 Pte. S. Mullacrane.  
 7365448 Pte. J. Pollard.  
 7391996 Pte. J. E. Roberts.  
 7265364 Pte. E. Saunders.  
 14554438 Pte. G. B. Vallance.  
 7377550 Pte. C. G. Winkle.

*The Army Dental Corps.*

Cook, Maj. W. C.  
 Drummond, Maj. G. T.  
 Greenfield, Capt. R. Y.  
 Herson, Capt. B.  
 Trick, Capt. W. L.  
 Smith, Sgt. A. J. R. 7537113.

*Queen Alexandra's Imperial Military Nursing Service.*

Percival, T/Pr. Matron F. M., R.R.C.  
 Kerridge, A/Pr. Matron D., R.R.C.  
 Masters, A/Pr. Matron M. M., R.R.C.  
 Dickinson, A/S.Sister E. F.  
 Hogg, A/S.Sister G. M.  
 Arneil, Sister K. S.  
 Athey, Sister A.  
 Bonsor, Sister Mrs. G. J.  
 Burr, Sister B. K.  
 Campbell, Sister M. A.  
 Foley, Sister H. M.

Fone, Sister M. K.  
 Gallimore, Sister Mrs. M. A.  
 Gough, Sister S. M., A.R.R.C.  
 Grierson, Sister I. M.  
 Hall, Sister B. L.  
 Harries, Sister G.  
 Heritage, Sister E.  
 Hudson, Sister P. B.  
 Jones, Sister E. E.  
 Jones, Sister M. E.  
 Kent, Sister F. Z.  
 Knight, Sister F.  
 Lambe, Sister C. P.  
 Large, Sister M.  
 Marshall, Sister Mrs. B.  
 MacKenzie, Sister A.  
 McCracken, Sister W. D.  
 McFadden, Sister B.  
 McLean, Sister W. M. S.  
 Meacham, Sister F. M.  
 Mitchell, Sister I. G.  
 Morgan, Sister D. M.  
 Murgatroyd, Sister B.  
 Nicholson, Sister A.  
 Notley, Sister Mrs. D. F.  
 O'Connell, Sister C.  
 O'Gara, Sister M. J.  
 Robins, Sister M. E.  
 Robinson, Sister D.  
 Roper, Sister I. H.  
 Rosling, Sister Mrs. M.  
 Russell, Sister A., R.R.C.  
 Russell, Sister J. E. W.  
 Strathern, Sister Mrs. A. R.  
 Sugden, Sister J. A.  
 Swan, Sister Mrs. M. H.  
 Tipping, Sister Mrs. C.  
 Tomkins, Sister E. L.  
 Trundle, Sister P. B.  
 Turner, Sister V. K.  
 Watterston, Sister A.  
 Williamson, Sister R. J.

*Territorial Army Nursing Service.*

Miller, A/S.Sister C. A.  
 Beadle, Sister I.  
 Crawford, Sister M.  
 Cromar, Sister M. M.  
 Davidson, Sister B. R.  
 Denyer, Sister P. M.  
 Eglinton, Sister E.  
 Keirl, Sister K. E.  
 Kellas, Sister A.  
 Lane, Sister E.  
 Low, Sister H. I.  
 Lowe, Sister J. E. H.  
 McLennan, Sister E.  
 McMinn, Sister M.  
 Mountain, Sister W. B.  
 Nicholson, Sister A.  
 Owen, Sister A. W.  
 Parry, Sister L. A.  
 Redgate, Sister K.  
 Redwood, Sister M. A.  
 Ruscoe, Sister M. E.  
 Stamper, Sister D. V.  
 Stanley, Sister M.  
 Summers, Sister M. J.  
 Taplin, Sister E. W.  
 Traynier, Sister M. E.  
 Trood, Sister M. M.  
 Walker, Sister D. E.  
 Walters, Sister M.

November 15.

**C.B.E.**

Bruce, L/Brig. J. (Burma)  
Hill, A/Brig. I. G. W., *T.D.* (Burma)  
Panton, T/Brig. D. F. (Burma)

**Bar to D.S.O.**

Lilwall, T/Maj. B. G. A., *D.S.O.* (Burma)

**O.B.E.**

Gass, T/Lt.-Col. H. (Burma)  
Mer, T/Lt.-Col. G. G. (Burma)  
Moffett, T/Lt.-Col. J. H. (Burma)  
Pace, T/Lt.-Col. T. A. (Burma)  
Stevens, T/Lt.-Col. A. V., *M.C.* (Burma)

**M.C.**

Ogilvie, Capt. A. M. (Burma)

**M.B.E.**

Davis, Capt. P. J. R. (Burma)  
Lee, Capt. R. H. S. ("in the field")  
Milne, T/Maj. A. (Burma)  
Wolstenholme, A/Lt.-Col. W. H. (Burma)

**R.R.C.**

(Burma)

Blaylock, A/Matron F. J., *T.A.N.S.*  
Heywood, A/Pr. Matron Mrs. E., *Q.A.I.M.N.S.R.*  
O'Connor, A/Pr. Matron M. E., *A.R.R.C.*,  
*Q.A.I.M.N.S.*  
Taplin, A/Pr. Matron D., *T.A.N.S.*  
Walden, A/Pr. Matron I., *Q.A.I.M.N.S.R.*

**A.R.R.C.**

(Burma)

Assersohn, Sister Mrs. M. J. C., *Q.A.I.M.N.S.R.*  
Davison, A/S. Sister D. E., *Q.A.I.M.N.S.R.*  
Holroyde, Sister M. S., *T.A.N.S.*  
Oliver, Sister D. J. S., *Q.A.I.M.N.S.R.*  
Pressdee, Sister C. A., *T.A.N.S.*  
Scott, Sister M. E., *Q.A.I.M.N.S.R.*

November 29.

**M.C.**

Lundie, Capt. A. R. T. ("in the field")

**MENTIONED.**

(Italy)

Brig. (temp.) S. Arnott, *C.B.E.*, *D.S.O.* (4215), late  
*R.A.M.C.*  
Col. C. H. K. Smith, *O.B.E.*, *M.C.* (15663), late  
*R.A.M.C.*  
Brig. (temp.) W. M. Cameron, *O.B.E.* (5585).  
Brig. (actg.) J. Kinnear, *O.B.E.*, *T.D.* (25970).  
Brig. (loc.) F. A. R. Stammers, *C.B.E.* (88791).  
Col. (temp.) W. A. D. Drummond (31405).  
Col. (temp.) T. D. Inch, *C.B.E.*, *M.C.*, *T.D.*  
(103140).  
Col. (temp.) W. A. Y. Knight (45043).  
Col. (temp.) A. S. Pern, *O.B.E.*, *T.D.* (25932).  
Col. (temp.) W. L. Spencer Cox, *O.B.E.*, *M.C.*  
(24005).  
Col. (actg.) J. T. Robinson (47427).  
Lt.-Col. (temp.) H. J. B. Atkins (221655).  
Lt.-Col. (temp.) T. F. Briggs (56002).  
Lt.-Col. (temp.) J. B. Herman (238824).  
Lt.-Col. (temp.) R. Johnston (52437).  
Lt.-Col. (temp.) D. W. E. Lloyd, *M.C.* (92650).  
Lt.-Col. (temp.) C. M. Marsden (53104).  
Lt.-Col. (temp.) J. B. McEwen, *M.C.* (91555).  
Lt.-Col. (temp.) J. S. Miller (70364).  
Lt.-Col. (temp.) T. P. Sewell (107674).

Lt.-Col. (temp.) E. G. Sibley (73606).

Lt.-Col. (temp.) W. R. Sprunt, *T.D.* (41717).

Lt.-Col. (temp.) A. W. S. Thompson, *O.B.E.*  
(111796).

Lt.-Col. (temp.) C. S. Thomson (139130).

Lt.-Col. (temp.) A. P. Trimble (52780).

Lt.-Col. (temp.) A. S. Wesson (152136).

Lt.-Col. (temp.) P. L. E. Wood, *D.S.O.*, *M.B.E.*  
(65535).

Maj. H. F. Anderson (136624).

Maj. R. L. Benison (49597).

Maj. A. D. C. S. Cameron (99446).

Maj. R. G. Davies (78637).

Maj. E. A. Fiddian (236894).

Maj. C. Kenton (173847).

Maj. W. McLeod (76548).

Maj. R. M. Paton (238402).

Maj. M. S. Williamson, *M.C.* (76244).

Maj. G. H. Wooler (87185).

Maj. (temp.) A. Beardwell (76911).

Maj. (temp.) D. Bell (131351).

Maj. (temp.) A. B. Birt (218958).

Maj. (temp.) R. W. Cope (103684).

Maj. (temp.) S. H. Croot (231983).

Maj. (temp.) D. H. Cummack (161606).

Maj. (temp.) H. W. Davis (125481).

Maj. (temp.) A. C. Dornhorst (133541).

Maj. (temp.) T. Duncan (107339).

Maj. (temp.) K. B. Gibson (127194).

Maj. (temp.) A. M. Giles (218908).

Maj. (temp.) R. E. Haswell (104610).

Maj. (temp.) J. Howell (163724).

Maj. (temp.) M. A. Jones (89568).

Maj. (temp.) A. R. Kennedy (125488).

Maj. (temp.) T. G. Lowden (221842).

Maj. (temp.) L. G. Macfarlane (127928).

Maj. (temp.) W. B. McKenna (128667).

Maj. (temp.) R. J. Milbank (104974).

Maj. (temp.) R. I. Mitchell (70600).

Maj. (temp.) A. A. Murray (111774).

Maj. (temp.) W. M. Owen (101992).

Maj. (temp.) J. H. Patterson (112651).

Maj. (temp.) W. A. V. Payne (99218).

Maj. (temp.) K. R. D. Porter, *M.B.E.* (136279).

Maj. (temp.) H. E. Smith (135681).

Maj. (temp.) R. S. Stevens (119927).

Maj. (temp.) D. L. Stewart (101004).

Maj. (temp.) A. M. Tait (122817).

Maj. (temp.) R. B. Terry (87184).

Maj. (temp.) A. J. Thomas (135351).

Maj. (temp.) J. H. Vickers (99203).

Maj. (temp.) M. A. G. Ward (173022).

Maj. (temp.) J. H. Warren, *M.B.E.* (123323).

Maj. (temp.) G. N. Wilson (128580).

Capt. E. S. Aiello (216504).

Capt. J. W. Clark (157301).

Capt. S. A. Cohen (252005).

Capt. H. J. S. Coldham (181426).

Capt. J. Comyn (175070).

Capt. A. Fearnley (225711).

Capt. D. Ferguson (163384).

Capt. R. Fletcher (133223).

Capt. N. E. France (227248).

Capt. (Q.M.) A. J. Hills (152801).

Capt. C. B. Hinckley (167798).

Capt. B. L. Hoffmann (216196).

Capt. (Q.M.) C. H. Hoskins (202660).

Capt. M. S. Howe, *M.C.* (248190).

Capt. P. H. Jones (230059).

Capt. W. A. D. Jones-Roberts (120151).

Capt. M. Latner (181724).

Capt. R. S. Lawrie (216335).

Capt. R. T. S. Louttit (266222).

Capt. B. S. Lush (246302).  
 Capt. J. Macdonald (191815).  
 Capt. A. F. J. Maloney (252491).  
 Capt. J. F. Mawe (73986).  
 Capt. R. P. Maybin (125846).  
 Capt. R. I. McAlley (236135).  
 Capt. A. D. McGill (104685).  
 Capt. J. D. McGregor (161276).  
 Capt. N. C. Mond (205935).  
 Capt. M. E. Moore (163376).  
 Capt. N. P. Orchard (163693).  
 Capt. A. T. Pagan (227577).  
 Capt. A. Paterson (216353).  
 Capt. D. E. Paterson (223757).  
 Capt. D. Purdie (183219).  
 Capt. E. E. Rawlings (221575).  
 Capt. J. J. Reeks (154085).  
 Capt. J. W. Richmond (89484).  
 Capt. J. F. Robertson (225946).  
 Capt. F. H. Robson (119642).  
 Capt. L. C. Robson (252494).  
 Capt. H. D. Rossiter (241377).  
 Capt. R. P. G. Sandon (246254).  
 Capt. J. Scott (199924).  
 Capt. H. A. Shaw (200154).  
 Capt. J. R. S. Shields (246821).  
 Capt. E. C. S. Talbot (111741).  
 Capt. J. E. Tannian (115958).  
 Capt. A. L. Tulk (199948).  
 Capt. E. Vure (238825).  
 Capt. A. S. Walker (169065).  
 Capt. J. S. Walters (125498).  
 Capt. D. Weitzman (297509).  
 Capt. F. J. Whitaker (225759).  
 Capt. A. L. Wyman (239232).  
 Capt. (temp.) F. de Burgh White (152953).  
 Lt. W. H. Chanter (313686).  
 Lt. (Q.M.) R. S. Cole (248857).  
 Lt. N. Dancer (303434).  
 Lt. (Q.M.) W. Davies (231128).  
 Lt. (Q.M.) A. E. Embleton (231126).  
 Lt. J. R. Grice (297427).  
 Lt. W. Hawthorne (282002).  
 Lt. F. H. Hogarth (313680).  
 Lt. R. J. Holliday (309435).  
 Lt. J. Noble (297434).  
 Lt. J. R. Purvis (316764).  
 Lt. E. A. Williams (322504).  
 Lt. C. D. Woodhead (303433).  
 7349120 W.O. I J. Cockeram.  
 7262515 W.O. I J. Dolaghan.  
 7261635 W.O. I L. Hawley.  
 7344201 W.O. I F. Morgan.  
 7257441 W.O. I F. Southon.  
 7356298 W.O. I G. B. Swann.  
 7354295 W.O. I (actg.) S. Young.  
 7356707 W.O. II L. W. Bedwin.  
 7369798 W.O. II J. H. J. Braybrook.  
 7249552 W.O. II F. I. Catley.  
 7348864 W.O. II W. G. Fry.  
 7261946 W.O. II C. D. Green.  
 7520434 W.O. II A. W. W. Paice.  
 7348764 W.O. II J. C. Payne.  
 7346021 W.O. II J. J. F. Whewell.  
 7379583 S/Sgt. W. E. Bacon.  
 7259874 S/Sgt. J. S. Blount.  
 7385103 S/Sgt. S. Bostock.  
 7257038 S/Sgt. J. W. Burr.  
 7358257 S/Sgt. P. P. Cashin.  
 7381036 S/Sgt. T. E. Dagwell.  
 7260048 S/Sgt. J. D. Donnelly.  
 7344677 S/Sgt. W. H. E. Drummond.  
 7516556 S/Sgt. A. Evans.  
 7344647 S/Sgt. L. F. Figg.  
 7257911 S/Sgt. H. Fox.  
 7262675 S/Sgt. G. Ingram.  
 7259776 S/Sgt. H. Jarman.  
 7261658 S/Sgt. W. H. Jenkins.  
 7258421 S/Sgt. E. Jones.  
 7348515 S/Sgt. J. C. Kelly.  
 7344775 S/Sgt. J. Leslie.  
 7256973 S/Sgt. F. H. Moody.  
 5620762 S/Sgt. C. V. Muggeridge.  
 7354746 S/Sgt. H. J. M. Pitt.  
 7375029 S/Sgt. J. Robb.  
 7370544 S/Sgt. A. Saunderson.  
 7520334 S/Sgt. V. A. Spilsted.  
 7372456 S/Sgt. C. Urquhart.  
 7259406 S/Sgt. A. Uttley.  
 7364154 S/Sgt. C. V. Wareham.  
 7357231 Sgt. W. Atkinson.  
 7345074 Sgt. A. C. Baggott.  
 7348499 Sgt. P. Bell.  
 7522241 Sgt. D. A. Buckler.  
 7386293 Sgt. C. B. Butterworth.  
 7365362 Sgt. C. Cattell.  
 7375289 Sgt. M. E. Chinchin.  
 7382856 Sgt. R. W. Dicker.  
 7367377 Sgt. S. L. Difford.  
 7356183 Sgt. W. A. Duff.  
 7359653 Sgt. F. Foster.  
 7354830 Sgt. W. Godfrey.  
 7266121 Sgt. C. H. Gordon.  
 7522739 Sgt. E. C. Hale.  
 7396052 Sgt. A. Hall.  
 7635878 Sgt. H. R. Herson.  
 7266985 Sgt. J. L. Higham.  
 7393133 Sgt. G. Holsgrove.  
 7266384 Sgt. H. W. Inman.  
 552976 Sgt. L. J. Lee.  
 7366339 Sgt. F. J. Linde.  
 7369771 Sgt. A. E. Macey.  
 7349078 Sgt. F. J. Manns.  
 7521954 Sgt. L. H. Marks.  
 7518187 Sgt. J. L. McMaster.  
 7348745 Sgt. W. J. F. Mitchell.  
 7261851 Sgt. G. S. B. Murdoch.  
 7379644 Sgt. L. G. Nichols.  
 7339910 Sgt. E. Rawcliffe.  
 7522068 Sgt. F. Reeve.  
 7254567 Sgt. R. E. Richards.  
 7364872 Sgt. R. W. Ritchie.  
 7359443 Sgt. L. P. Smith.  
 7369885 Sgt. R. E. Smith.  
 7523293 Sgt. F. J. Stephens.  
 7380862 Sgt. M. Thompson.  
 7386808 Sgt. J. Townley.  
 5103112 Sgt. (actg.) C. H. Bates.  
 7519281 Sgt. (actg.) C. J. Brige.  
 7391471 Sgt. (actg.) E. G. Head.  
 7404728 Sgt. (actg.) A. M. Walter.  
 7345418 L/Sgt. J. A. Morton.  
 7406680 L/Sgt. (actg.) W. J. Baker.  
 7265195 Cpl. I. Allen.  
 7378732 Cpl. V. Bennett.  
 7385866 Cpl. W. A. Bodman.  
 7520178 Cpl. C. O. Booth.  
 7348599 Cpl. K. T. Boulton.  
 7520460 Cpl. L. H. Brown.  
 7522995 Cpl. S. W. Burns.  
 7360473 Cpl. P. E. Chuter.  
 5333818 Cpl. W. R. Cordery.  
 7203634 Cpl. D. G. Daykin, M.M.  
 7345733 Cpl. D. A. Emms.  
 7374953 Cpl. A. T. Furbear.  
 7385493 Cpl. F. H. Garley.

7362024 Cpl. F. Gartland.  
 7266144 Cpl. H. G. Handley.  
 7388053 Cpl. J. Heyes.  
 7380109 Cpl. E. Holroyd.  
 7373964 Cpl. D. V. O. James.  
 7366863 Cpl. D. MacKenzie.  
 7369836 Cpl. C. F. Mansell.  
 7364520 Cpl. C. H. Martin.  
 7357357 Cpl. R. W. R. Oakes.  
 7384207 Cpl. M. Owen.  
 7363887 Cpl. C. J. Scudder.  
 7372548 Cpl. W. W. Smy.  
 7403029 Cpl. T. E. G. Stratton.  
 7356174 Cpl. H. E. C. Thomas.  
 7371626 Cpl. J. Thomas.  
 7361105 Cpl. D. Williams.  
 6911120 Cpl. J. Yates.  
 7522225 Cpl. (actg.) W. E. Watt.  
 7265684 L/Cpl. T. H. Blake.  
 7358095 L/Cpl. A. Briscoll.  
 7369228 L/Cpl. H. L. Broder.  
 7371227 L/Cpl. J. V. Edwards.  
 7364027 L/Cpl. G. Goodwin.  
 7398383 L/Cpl. H. D. Hughes.  
 7359776 L/Cpl. J. Kelly.  
 7403410 L/Cpl. F. W. G. Kelsey.  
 14234644 L/Cpl. C. Kirkman.  
 7388708 L/Cpl. J. H. Masters.  
 7344820 L/Cpl. O. L. P. Mills.  
 7343883 L/Cpl. G. Roper.  
 7365009 L/Cpl. F. G. Sadler.  
 7393320 L/Cpl. W. H. Sorfleet.  
 857359 L/Cpl. R. P. Watson.  
 7345335 Pte. J. Berry, *M.M.*  
 7400660 Pte. N. J. Blower.  
 7396983 Pte. P. Bolsover.  
 7379931 Pte. W. L. Briggs.  
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Capt. S. G. Sellars (125948).  
 Capt. H. S. Shepherd (127512).  
 Capt. (temp.) W. J. Collins (91849).  
 7538534 S/Sgt. G. C. Matthew.  
 7536651 Sgt. (actg.) J. E. L. MacLoughlin.  
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 Sister A. M. Norfolk (215013).  
 Sister W. A. Woodfine (215864).

November 2.—The undermentioned to be Maj.s. :—

12 Oct. 1945 :—

War Subs. Maj. A. B. Dempsey (66501).

23rd Oct. 1945 :—

Capt. J. A. G. Carmichael (67840).

War Subs. Maj. W. Stewart, *M.B.E.*, *M.B.* (70115).

War Subs. Maj. J. A. Davidson, *M.D.* (70121).

Capt. E. A. Smyth, *M.B.* (70120).

24th Oct. 1945 :—

War Subs. Maj. M. H. P. Sayers, *O.B.E.*, *M.B.* (66473).

War Subs. Maj. D. P. Stevenson (66486).

Capt. W. N. L. Haynes (44417).

Capt. J. F. Wilson, *M.D.* (62173).

War Subs. Maj. G. A. E. Harman, *M.B.* (66481).

Capt. J. R. Kellett, *M.B.E.*, *M.B.* (66477).

War Subs. Maj. K. G. F. Mackenzie, *M.B.*, *F.R.C.S.* (66482).

27th Oct. 1945 :—

War Subs. Maj. A. T. Marrable, *D.S.O.* (67301).

Capt. I. N. Fulton (70127).

War Subs. Maj. J. K. Slater, *O.B.E.*, *M.D.*, *F.R.C.P.* (21433) *R.A.M.C.* to be a Consultant and is granted the local rank of Brig., 14th July 1945.

November 9.—Lt.-Col. R. McKinlay, *O.B.E.*, *M.B.* (8719), from *R.A.M.C.*, to be Col., 29th Oct. 1945, with seniority, 26th Mar. 1944.

Lt.-Col. A. E. Richmond, *C.B.E.* (9946), from R.A.M.C., to be Col., 29th Oct. 1945, with seniority, 26th Mar. 1944.

The undermentioned to be Lt.-Cols., 29th Oct. 1945 :—

Maj. H. A. Ferguson, *M.B.* (3812).

Maj. (War Subs. Lt.-Col.) J. J. O'Dwyer, *M.B.* (38136).

Lt.-Col. R. McKinlay, *O.B.E.*, *M.B.* (8719), is restored to the establishment, 1st Oct. 1945.

November 13.—Capt. I. D. Paterson, *M.B.* (99318) is placed on the h.p. list on account of disability, 28th Oct. 1945.

November 20.—The undermentioned holding short service Comms. are appointed to permanent comms. retaining their present seniority :—

26th Oct. 1945 :—

Capt. T. W. Carrick, *M.B.* (154131).

8th Nov. 1945 :—

Capt. A. J. Fulthorpe, *M.B.* (154546).

November 30.—War Subs. Capt. Philip Westall Kippax, *M.B.* (230837) from R.A.M.C. (Emerg. Commn.) is granted a Short Service Commn., in the rank of Lt., 4th Apr. 1942, and to be Capt., 4th Apr. 1943.

## REGULAR ARMY RESERVE OF OFFICERS.

November 9.—The undermentioned having exceeded the age limit of liability to recall cease to belong to the Res. of Offrs. :—

14th Aug. 1945 :—

War Subs. Lt.-Col. J. P. Litt, *M.D.* (3709), and is granted the hon. rank of Col.

24th Aug. 1945 :—

Maj. H. H. Mulholland, *M.B.* (12481), and is granted the hon. rank of Lt.-Col.

25th Aug. 1945 :—

War Subs. Lt.-Col. W. B. Laird, *M.B.* (4811), and is granted the hon. rank of Col.

26th Aug. 1945 :—

Lt.-Col. F. C. Davidson, *M.C.*, *M.B.* (51029), and is granted the hon. rank of Col.

1st Sept. 1945 :—

Maj. R. J. Clausen, *M.C.*, *M.B.* (1213).

11th Sept. 1945 :—

War Subs. Lt.-Col. D. B. McGrigor, *O.B.E.*, *M.B.* (10911), and is granted the hon. rank of Col.

War Subs. Maj. R. N. Porritt (13299), and is granted the hon. rank of Lt.-Col.

17th Sept., 1945 :—

War Subs. Maj. H. B. Walker, *M.C.*, *M.B.*, *F.R.C.S.* (34077), and is granted the hon. rank of Lt.-Col.

18th Sept. 1945 :—

Maj. W. Stewart, *M.B.* (3032), and is granted the hon. rank of Lt.-Col.

19th Sept. 1945 :—

Lt.-Col. L. F. K. Way, *D.S.O.* (50578), retaining the rank of Lt.-Col.

23rd Sept. 1945 :—

Maj. P. A. Stewart, *M.B.* (24745), and is granted the hon. rank of Lt.-Col.

4th Oct. 1945 :—

War Subs. Maj. J. E. Foley (5075), and is granted the hon. rank of Lt.-Col.

8th Oct. 1945 :—

Maj. T. K. Boney, *M.D.* (8618), and is granted the hon. rank of Lt.-Col.

21st Oct. 1945 :—

War Subs. Lt.-Col. L. G. Bourdillon, *D.S.O.*, *M.C.*, *M.B.* (5029), and is granted the hon. rank of Col.

23rd Oct. 1945 :—

Capt. W. L. Partridge, *M.C.* (14170), and is granted the hon. rank of Maj.

26th Oct. 1945 :—

War Subs. Maj. T. R. Snelling (14378), and is granted the hon. rank of Lt.-Col.

27th Oct. 1945 :—

Maj. P. Carney, *M.C.*, *M.B.* (15688), and is granted the hon. rank of Lt.-Col.

2nd Nov. 1945 :—

War Subs. Lt.-Col. H. C. Todd, *M.B.*, *F.R.C.S.*, (5196), and is granted the hon. rank of Col.

10th Nov. 1945 :—

War Subs. Maj. A. L. Taylor, *M.B.*, *F.R.C.P.* (28474), and is granted the hon. rank of Col.

November 13.—War Subs. Maj. W. H. Valentine, *O.B.E.*, *M.D.* (66452), from Supp. Res. of Offrs. to be War Subs. Maj., 13th Nov. 1945.

November 16.—The undermentioned having exceeded the age limit of liability to recall cease to belong to the Res. of Offrs. :—

25th Aug. 1945 :—

Maj. W. F. Christie, *M.D.* (51529).

1st Sept. 1945 :—

Maj. W. A. Rankin (15737) and is granted the hon. rank of Lt.-Col.

7th Oct. 1945 :—

War Subs. Lt.-Col. D. McVicker, *O.B.E.*, *M.C.*, *M.B.*, *F.R.C.S.* (14146), and is granted the hon. rank of Col.

12th Nov. 1945 :—

Capt. J. A. Cowan, *M.B.* (70113).

16th Nov. 1945 :—

War Subs. Maj. W. Moodie, *M.D.* (50562), and is granted the hon. rank of Lt.-Col.

November 27.—Capt. A. G. Stevenson, *M.B.* (5513), having attained the age limit of liability to recall, ceases to belong to the Res. of Offrs., 13th Oct. 1945.

November 30.—War Subs. Maj. S. D. Loxton, *M.B.* (66495), from Supp. Res. of Offrs., to be War Subs. Maj., 20th Nov. 1945.

War Subs. Capt. G. A. Campbell (100491) having exceeded the age limit of liability to recall, ceases to belong to the Res. of Offrs., 23rd Nov. 1945, and is granted the hon. rank of Maj.

## AWARD.

Captain G. T. L. Scott, King's Own Scottish Borderers, was awarded a Military Cross in Ger-

many on January 21, 1945. He is the elder son of Colonel T. H. Scott, late R.A.M.C. retired.



## DEATHS.

EVANS.—In Fleet, Hants, on Nov. 6, 1945, Colonel Percy Evans, *C.M.G.*, late *R.A.M.C.*, Retired. Born in Richmond, Surrey, Nov. 16, 1868, he took the *M.B.*, Durham, in 1893 and the *D.P.H.* in 1896. Commissioned Surgeon Lieutenant, July 28, 1894, he was promoted Surgeon Captain, July 28, 1897, Major *R.A.M.C.* Jan. 29, 1906, Lieutenant-Colonel March 1, 1915, Colonel Dec. 26, 1917, and retired Dec. 26, 1923. He served in South Africa 1900–1902. He took part in the operations in the Orange Free State and Transvaal, including action at Zilikats Nek, and in Cape Colony. He received the Queen's Medal with three Clasps and the King's Medal with two Clasps. He was in France from Aug., 1914, till 1917. In Egypt March to Aug., 1918, and in Mesopotamia from Aug., 1918, till Aug., 1919. He was an *A.D.M.S.* in France and in Mesopotamia *D.D.M.S.*, *L. of C.* Four times mentioned in despatches, he was created *C.M.G.*, and awarded the 1914 Star and Clasp, British War and Victory Medals.

WARING.—On Nov. 7, 1945, Lieutenant-Colonel Arthur Durham Waring, *M.B.*, *R.A.M.C.*, Retired. Born Jan. 18, 1875, he took the *M.B.*, Dublin, in 1900 and was commissioned Lieutenant *R.A.M.C.* April 25, 1900. Promoted Captain April 25, 1903, Major Jan. 25, 1912, and Lieutenant-Colonel Dec. 26, 1917, he retired Nov. 20, 1924. He held the Retired Pay appointment at Bury St. Edmunds from Dec. 11, 1924, till Oct. 31, 1939. In the war of 1914–1918, he served in

France from Aug. 18, 1914, till March 4, 1916, and in Macedonia May 10, 1917, till March 16, 1919. He was mentioned in despatches and received the 1914 Star and Clasp, British War and Victory Medals and the Greek Medal for Military Merit, 3rd Class.

THURSTON.—In London on Nov. 18, 1945. Colonel Hugh Stanley Thurston, *C.B.*, *C.M.G.*, *C.B.E.*, late *R.A.M.C.*, Retired. Son of Hugh K. Thurston, of Morton, Gloucestershire, he was born in Blandford, Dorsetshire, May 21, 1869, and took the *M.R.C.S.* and *L.R.C.P.*, London, in 1891. He entered the Service as Surgeon Lieutenant July 27, 1892. Promoted Surgeon Captain July 27, 1895, Major *R.A.M.C.* July 27, 1904, Lieutenant-Colonel Feb. 8, 1915, and Colonel Dec. 26, 1917, he retired Dec. 26, 1921. He served on the North West Frontier of India in 1897–1898 receiving the Medal with Clasp. He again saw active service in South Africa in 1902, taking part in the operations in Cape Colony and the Transvaal. He was mentioned in despatches and received the Queen's Medal with three Clasps. He served in France from Aug. 15, 1914, till Aug. 4, 1919, first as *A.D.M.S.* and subsequently as *D.D.M.S.* Eight times mentioned in despatches, he was created *C.B.*, *C.M.G.*, *C.B.E.*, and Commander of the Military Order of Avis (Portugal), and received the 1914 Star and Clasp, British War and Victory Medals and the *Medaille d'Argent de la Reconnaissance* (France).

No. 6.

December, 1945.

Vol. LXXXV.

# Journal

OF

THE

# Royal Army Medical Corps

ISSUED



MONTHLY

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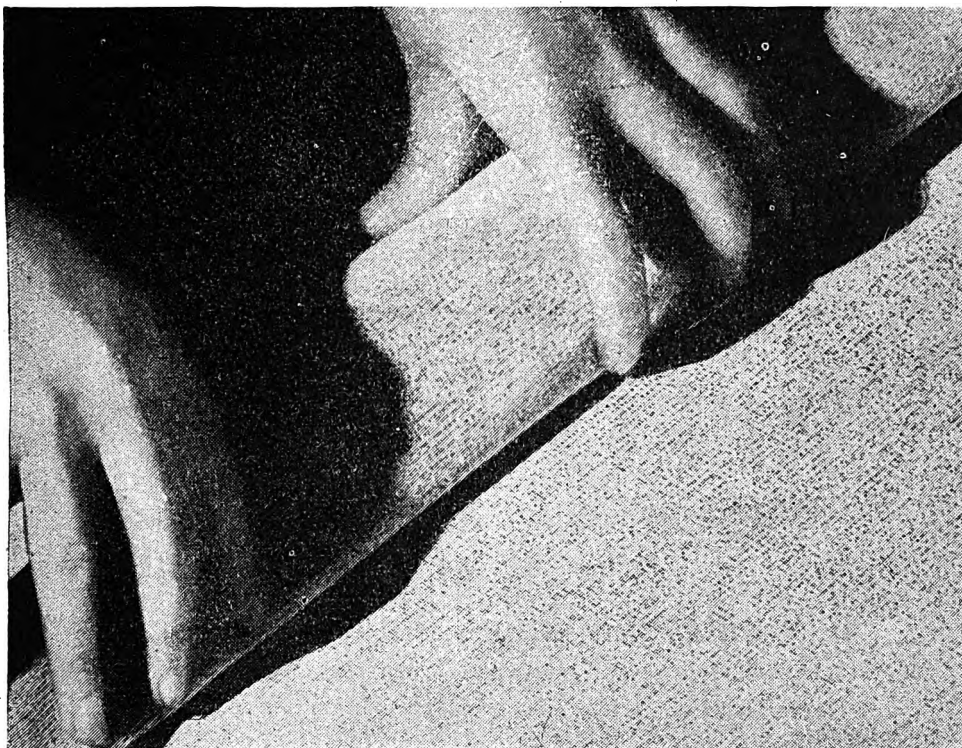
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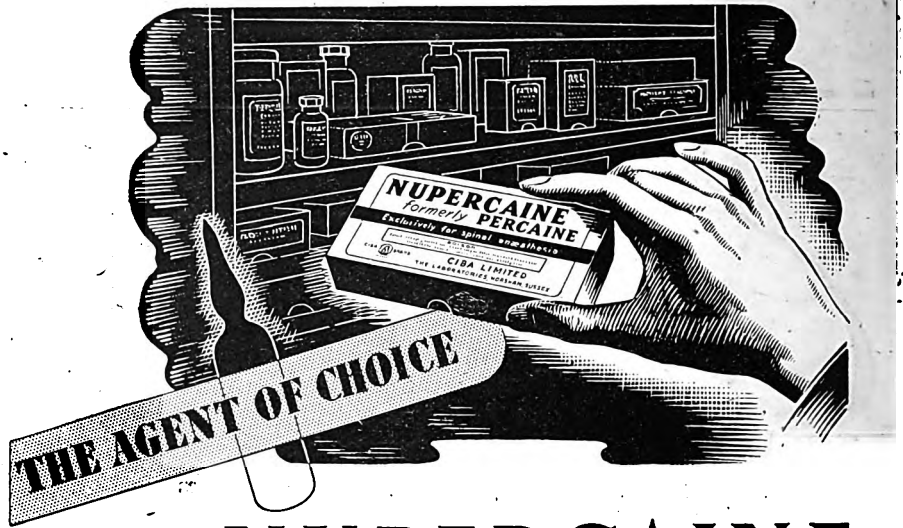
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